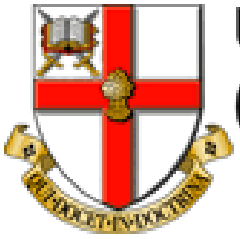

University of Chester

Department of Clinical Sciences

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Johanna Calleja

Dissertation - September 2011

Promoting physical activity in general practice: Maltese GPs' beliefs, attitudes and practices

Johanna Calleja

"Dissertation submitted in accordance with the requirements of University of Chester for the degree of Master of Science"

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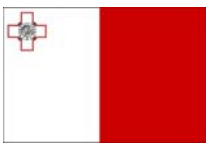

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Abstract

Purpose: The aim of this research project was to investigate promotion of physical activity (PA) in general practice in Malta, by analysing Maltese general practitioners' (GPs') beliefs, attitudes and self-reported practices.

Method: All Maltese GPs were invited to participate in this postal survey, whereby data was collected using a validated questionnaire about PA in general practice. The main outcome measures included knowledge, role perception, confidence, barriers and frequency of PA promotion, feasibility of different PA promotion strategies and GPs' PA levels.

Results: The response rate was 53% (156 replies out of 296). Although role perception was high, PA promotion was generally low (52% promoted PA to < 30% of patients), with GPs more likely to promote PA if they perceived it as relevant to the patient's condition. Only 19% of GPs knew the national PA recommendations, with those who did being somewhat more likely to promote PA to > 30 patients/month than those who did not (59% vs. 41%, p = 0.082). GPs were more confident in giving general PA advice than suggesting specific PA programmes, and a relationship was found between confidence and frequency of promoting PA (p = 0.005, r = 0.226). There was also a relationship between GPs' PA levels and frequency of promoting PA (p = 0.038, r = 0.168). The most common barrier was lack of time, while brief counselling during consultations was considered most feasible.

Conclusion: Initiatives are required to increase knowledge about PA recommendations and PA promotion among Maltese GPs. Due to numerous advantages and GPs' hypothetical support, a framework in which GPs recommend increased PA and offer referrals to a PA counsellor could be ideal. However, research is required about how to implement such a framework. PA promotion by GPs could have a significant public health impact, particularly since physical inactivity and obesity levels are very high in Malta.

Keywords: Exercise; health promotion; behaviour change; counselling; family practice.

Originality declaration

This work is original and has not been previously submitted in support of a Degree, qualification or other course.

Signed……

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Chapter 1: Introduction

1.1. The link between physical activity and health

"Those who think they have no time for bodily exercise will sooner or later have to find time for illness" (Edward Stanley, 20th December 1873, Liverpool College address). Physical activity (PA) and fitness have been linked with health and longevity since ancient times, as far back as around 2500 BC in China, and the fifth century BC in Greece (Hardman & Stensel, 2009).

Health and well-being include the state of physical, mental, social and spiritual health (Buckley & Hughes, 2008), while fitness is the ability to perform moderate to vigorous levels of PA without undue fatigue and the capability of maintaining such ability throughout life (American College of Sports Medicine [ACSM], 1990). Dwyer and Davis (2008) define exercise as structured, planned activities designed to promote or enhance overall physical fitness, and PA as any bodily movement, regardless of intensity, that is not designed specifically around the purpose of enhancing physical fitness.

At the start of modern-day exercise research, studies by Morris and Crawford (1958) found an association between PA/inactivity at work and coronary heart disease (CHD). Subsequent studies have led to consensus that physical inactivity leads to CHD and other diseases and health problems (Blair & Connelly, 1996). The inverse associations appear strongest between PA/fitness and all-cause and cardiovascular mortality, but lower incidence rates of hypertension, obesity, colon cancer, type 2 diabetes and osteoporosis are also consistently reported, with more research needed

about other chronic diseases (ACSM, 2000). PA has also been shown to have a beneficial effect on metabolic syndrome, immune function, functional capacity/capabilities, musculo-skeletal health and psychological well-being for all sectors of the population (Biddle & Mutrie, 2008), as well as playing a therapeutic role for people with various conditions, such as osteoporosis, arthritis and pulmonary disease (Buckley & Hughes, 2008).

Prior to the mid-1990s, the ACSM recommended structured, vigorous exercise with physical fitness as the goal (Mackinnon, Ritchie, Hooper & Abernethy, 2003). However, as evidence started emerging that PA can provide health benefits without the necessity of improvements in physical fitness, publications began emphasising lower levels of regular activity for health through a physically active lifestyle, with physical fitness improvements as a secondary outcome (Haskell, 1994). These newer publications aim to encourage the most sedentary persons to become at least moderately active, a goal which appears more achievable than higher levels of activity and can reduce risk substantially, while acknowledging that further benefits can be obtained by going beyond the minimum guidelines (Blair & Connelly, 1996).

In 2010, the British Association of Sport and Exercise Sciences issued a consensus statement recommending that all healthy adults aim to take part in at least 150 minutes of moderate-intensity, or 75 minutes of vigorous-intensity aerobic activity each week, or equivalent combinations of moderate- and vigorous-intensity activities (O'Donovan, Blazevich, Boreham, Cooper, Crank, Ekuland, et al., 2010). This activity should be undertaken in bouts of at least ten minutes and ideally should be performed on five or more days a

week, with muscle-strengthening activities also being performed on two or more days a week (O'Donovan et al., 2010). Beginners should work steadily towards meeting these PA levels, whereas individuals who have met the minimum recommendations for at least six months – particularly those who find it difficult to maintain a normal weight or those with increased risk of cardiovascular disease or type 2 diabetes – may obtain additional health benefits by engaging in 300 minutes or more of moderate-intensity, or 150 minutes or more of vigorous-intensity, aerobic activity each week, or equivalent combinations of moderate- and vigorous-intensity activities (O'Donovan et al., 2010).

Following this consensus statement, the four Chief Medical Officers of England, Scotland, Wales and Northern Ireland recently updated the UK's PA guidelines (Department of Health, Physical Activity, Health Improvement and Protection, 2011). While these guidelines link closely to previous recommendations, they also emphasise that adults should aim to be active daily and should minimise the amount of time spent being sedentary for extended periods.

Notwithstanding these recommendations, at least 60% of the world's population fails to complete the recommended amount of PA required to induce health benefits (World Health Organisation [WHO], 2010). Physical inactivity, smoking and poor diet are the root cause of around one-third of deaths in developed countries, and there have been marked increases in the prevalence of numerous chronic diseases of which physical inactivity is a risk factor, making physical inactivity a global cause for concern (Hardman & Stensel, 2009).

1.2. Rationale for the promotion of physical activity by GPs

Disease prevention and health promotion are important tasks in general practitioners' (GPs') daily practice, with a new suggested definition of general practice emphasising the role of GPs in prevention, stating that "the general practitioner engages with autonomous individuals across the fields of prevention, diagnosis, cure, care, and palliation, using and integrating the sciences of biomedicine, medical psychology, and medical sociology" (Olesen, Dickinson & Hjortdahl, 2000, p.355).

It has been reported that over 70% of the UK population visit their GP at least once a year and almost 95% do so over a three-year period (Taylor, 2003). GPs are seen as a credible source of information (Tulloch, Fortier & Hogg, 2006), and, in addition, a survey in the UK found that 72% of respondents thought GPs should be interested in their fitness levels (Wallace & Haines, 1984). There is thus a strong case for the potential public health impact through the promotion of PA by GPs.

However, following a review of the literature on the effectiveness of primary care PA counselling for the U.S. Preventive Services Task Force (USPTF), it was concluded that there is insufficient evidence to determine whether such counselling should be recommended (Eden, Orleans, Mulrow, Pender & Teutsch, 2002). The balance of potential benefits and harms of routine counselling to promote PA could not be determined since the reviewed trials presented mixed results; and data on the feasibility and potential harms were limited.

Nonetheless, this view is contrary to the majority of recommendations, which state that healthcare providers should counsel individuals about PA, including the recommendation from the UK Department of Health (DH) (2005) for health professionals to increase the provision of advice to patients on lifestyle, particularly on PA. This could be undertaken as part of routine clinical care and would not require an investment of additional resources (Smith, Merom, Harris & Bauman, 2002). The American College of Preventive Medicine states that this is important due to the health benefits of regular PA and the fact that some behavioural interventions have been shown to be effective in the primary care setting (such as advice to quit smoking) (Jacobson, Strohecker, Compton & Katz, 2005).

However, Lawlor and Hanratty (2001) found that much of the available evidence about routine advice to increase PA is of poor quality and called for better quality research, but maintained that lack of evidence of effectiveness is not the same as evidence of lack of effect. Moreover, in evaluating the extent to which the literature on primary-care-based PA counselling informs the translation of research into practice, Eakin, Smith and Bauman (2005) found that the questions posed in such studies have been overly focused on intervention efficacy and related issues of internal validity, with significantly less attention paid to practical issues related to implementation and generalisability. Thus, while the trials to date are generally effective in demonstrating short-term changes in PA, they are much less informative about the potential for such interventions to play a role in impacting population health by reaching large segments of the population in a feasible manner (Eakin et al., 2005). Although the reviewed primary-care-based PA counselling interventions produced small effects, they could potentially reach

a large percentage of the population and such interventions would have a greater impact than ones that produced large effects but reached a smaller proportion of the population (Eakin et al., 2005).

This is because even if a relatively small percentage of patients respond to GP counselling to become more physically active, this could produce a large absolute number of individuals who adopt and maintain regular activity associated with improved health (Pinto, Goldstein & Marcus, 1998) and the obesity epidemic means that PA may require promotion by any expedient means available (Jacobson et al., 2005). Thus, the general consensus is that PA promotion by GPs could have a significant public health impact and should be encouraged.

1.3. Previous studies of GPs' beliefs, attitudes and practices of physical activity promotion

Due to this general consensus, several studies have been conducted in various countries to analyse GPs' beliefs, attitudes and practices of PA promotion. Countries where such studies have been conducted include Australia (Bull, Schipper, Jamrozik & Blanksby, 1995 and 1997; Harris & Smith, 2003; van der Ploeg, Smith, Stubbs, Vita, Holford & Bauman, 2007; Buffart, van der Ploeg, Smith, Kurko, King & Bauman, 2009), the UK (McKenna, Naylor & McDowell, 1998; Lawlor, Keen & Neal, 1999; Douglas, Torrance, van Teijlingen, Meloni & Kerr, 2006), the USA (Williford, Barfield, Lazenby & Scharff Olson, 1992; Walsh, Swangard, Davis & McPhee, 1999; Frank, Bhat Schelbert & Elon, 2003) and Canada (Kennedy & Meeuwisse, 2003). Some of these studies have also analysed the views of other health practitioners alongside GPs' views. McKenna et al. (1998) compared GPs

and practice nurses' responses, while Douglas et al. (2006) surveyed GPs, practice nurses and health visitors. Frank et al. (2003), Williford et al. (1992) and Walsh et al. (1999) analysed different physicians' responses collectively but in the case of the latter two studies, these physicians were primarily internists and family practitioners.

Rather than investigating PA promotion separately, other studies have also examined GPs' knowledge and attitudes regarding lifestyle counselling and various health promotion activities, including PA. One such study was carried out in eleven European countries, including Malta (Brotons, Björkelund, Bulc, Ciurana, Godycki-Cwirko, Jurgova et al., 2005) and the Maltese results of this study have also been published separately (Sammut, 2006).

1.3.1. Level of physical activity promotion

Several studies have found that the level of PA promotion in general practice is low, as summarised in Table 1.

Table 1: *Summary of selected studies of GPs' PA promotion practices and the reported level of PA promotion*

Reference	*N*	Country	Reported level of PA promotion among GPs
Brotons et al. (2005)	2,082	Europe	56% promote PA to sedentary patients
Buffart et al. (2009)	511 747 646	Australia	1997: 43% discuss PA with ≥10 patients/wk 2000: 44% discuss PA with ≥10 patients/wk 2007: 53% discuss PA with ≥10 patients/wk
Bull et al. (1995)	908	Australia	21% promote PA to all patients
Douglas et al. (2006)	376	UK	62% likely/very likely to recommend PA to all healthy adult patients
Kennedy & Meeuwisse (2003)	330	Canada	21% counsel 50-75% of patients about PA 12% counsel ≥ 76% of patients about PA
McKenna et al. (1998)	419	UK	69% regularly promote PA
Sammut (2006)	156	Malta	61% promote PA to sedentary patients
Walsh et al. (1999)	175	USA	43% of physicians counsel > 50% of patients about PA

Only 43% of Australian GPs in 1997 and 44% in 2000 reported discussing PA with at least 10 patients a week (Buffart et al., 2009). By 2007, this percentage increased somewhat to 53%. However, the authors hypothesised that this could be due to the decline in response rate from 64% in 1997 and 53% in 2000 to 40% in 2007. This decline might have introduced selection bias, with GPs who are more interested in the topic being more likely to have responded, possibly resulting in an overestimation of counselling behaviour (Buffart et al., 2009). In Canada, 67% of GPs reported counselling less than 50% of their patients about PA, with only 12% claiming to counsel 76-100% of patients (Kennedy & Meeuwisse, 2003). Similarly, only 43% of American physicians claimed to counsel more than 50% of their patients about PA

(Walsh et al., 1999). Bull et al. (1995) found that while 52% of Australian GPs agreed that PA should be recommended to all patients, only 21% reported doing so in practice.

Some other studies have obtained slightly more encouraging results. Sixty-nine per cent of British GPs reported regularly promoting PA with their patients (McKenna et al., 1998). In Europe, while 82% of GPs from eleven countries stated that sedentary patients should be advised to perform regular PA, 56% reported doing so in practice (Brotons et al., 2005). Likewise, 96% of Maltese GPs in this study stated that sedentary patients should be advised to perform regular PA, while 61% reported doing so (Sammut, 2006).

Therefore, while some studies have found slightly higher levels of PA promotion among GPs than others, the reported levels are generally low. Unfortunately, however, one of the limitations of the literature is that different studies have adopted different measures of levels of PA promotion, which renders comparison somewhat difficult.

It has also been shown that lower rates of PA counselling by GPs are reported by patient surveys than by GP self-report (Pinto et al., 1998). This could be due to the possibility of social desirability bias and selection bias inherent in questionnaire studies conducted by GP self-report, which could lead to an overestimation of PA counselling practices (Buffart et al., 2009). One study analysed the agreement of patient reports regarding GPs' advice to reduce dietary fat and increase PA and GPs' self-report (Kreuter, Scharff, Brennan & Lukwago, 1997). According to GPs' self-report, they advised 72% of a random sample of patients to increase PA, whereas only 31% of these

patients reported having received such advice (Kreuter et al., 1997). Levels of agreement between GP and patient reports of PA advice were 58%, with 88% of non-agreeing cases involving GPs reporting that they advised patients and patients reporting that they were not advised (Kreuter et al., 1997). This indicates that studies of GPs' PA promotion practices by self-report tend to over-estimate such practices.

1.3.2. Routine promotion of physical activity versus promotion as secondary prevention

Several studies have also investigated the levels of routine promotion of PA versus promotion as secondary prevention. A survey to determine the lifetime prevalence of health professional advice to exercise among individuals in the USA found that 73% of adults with diabetes were told to exercise more by a health professional, as opposed to 31% of adults without diabetes (Morrato, Hill, Wyatt, Ghushchyan & Sullivan, 2006). Similarly, Wee, McCarthy, Davis and Phillips (1999) found that patients who were overweight to obese (BMI 25 to ≥ 30 $kg \cdot m^{-2}$) were more likely to be counselled than those with BMI lower than 25 $kg \cdot m^{-2}$, as were patients with cardiac disease and diabetes ($p < 0.001$).

Studies of GP self-report confirm these findings. Douglas et al. (2006) found that 47% of GPs agreed that they only advise patients about PA if linked to their presenting problem, while only 33% disagreed (20% neutral). The percentage of GPs who stated they would always or often provide PA advice for different patient categories was highest in the case of overweight patients (97%), followed by patients with hypertension (89%), patients with known

IHD (89%), diabetic patients (80%), patients with hypercholesterolemia (68%) and depressed patients (65%).

Lawlor et al. (1999) also found that GPs would give PA advice to patients who were overweight more frequently than any other condition listed (77% always, 0% never). The frequency of giving PA advice was also high for patients with risk factors for ischaemic heart disease (IHD) (56% always, 1% never), hypertension (47% always, 1% never), known IHD (41% always, 1% never) and diabetes (33% always, 5% never), whereas the frequency of giving advice opportunistically to all patients was much lower (8% always, 22% never). Bull et al. (1995) also found that GPs recommended PA programmes most frequently to patients in need of weight management (97% often/almost always, 0.5% infrequently/almost never) and patients with symptoms of conditions that could benefit from PA (91% often/almost always, 0.8% infrequently/almost never), with only 21% of GPs indicating that they often or almost always recommended PA to all patients (39% infrequently/almost never) (Bull et al., 1995).

Therefore, studies clearly indicate that PA promotion occurs mainly if PA is relevant to a patient's presenting condition, rather than routinely with all patients.

1.3.3. GPs' knowledge of the physical activity recommendations

The majority of studies have found that GPs' knowledge of the PA guidelines is very low. In Scotland, only 13% of GPs recorded the correct recommendations and 18% recorded the previous ones (20 minutes PA 3

times a week) (Douglas et al., 2006). In the USA, only 23% of respondents knew the ACSM guidelines regarding the development of exercise prescriptions (Williford et al., 1992), whereas in a later study even fewer respondents (12%) knew them (Walsh et al., 1999). Walsh et al. (1999) found that physicians who knew the ACSM recommendations were somewhat more likely to engage in regular exercise counselling (62% vs. 40%, $p = 0.06$).

1.3.4. GPs' knowledge of physical activity required for health benefits

Contrary to the low levels of knowledge of the PA recommendations, Lawlor et al. (1999) reported good general knowledge of the levels of PA required to achieve health gain among English GPs, since 73% of respondents agreed that any amount of PA is beneficial to health, while only 8% believed that only vigorous/strenuous activity is beneficial to health.

Buffart et al. (2009) monitored the trends in Australian GPs' knowledge, confidence, role perceptions and practices related to PA promotion between 1997 and 2007, to examine the extent that initiatives to promote community participation in PA and to increase attention to this issue in general practice resulted in changes. The number of GPs who believed that "taking the stairs and generally being more active each day is beneficial for health" (30% in 1997, 57% in 2000, 52% in 2007) and that "10 minute bouts of walking on most days are better than just one longer session per week" (65% in 1997, 79% in 2000, 79% in 2007) improved between 1997 and 2000, but remained unchanged between 2000 and 2007. Compared with 2000, fewer GPs in 2007 believed that half an hour of walking on most days is all the exercise that is needed for good health (64% in 1997, 82% in 2000, 68% in 2007) and

more GPs in 2007 believed that vigorous activity is necessary to obtain health benefits (18% in 1997, 10% in 2000, 25% in 2007). The authors hypothesised that the shift towards greater emphasis on vigorous-intensity exercise in 2007 could be related to the rise in prevalence of obesity in the Australian population and its increased media attention, since the minimum recommended amount of 30 minutes/day of moderate PA five days/week is not enough to prevent and reduce overweight and obesity and higher intensities or longer durations are recommended (Buffart et al., 2009).

However, although Australian GPs' knowledge increased significantly between 1997 and 2000 in relation to three of the four statements related to knowledge ($p \leq 0.013$), as did their confidence levels and role perception with regards to PA promotion *(Refer to Sections 1.3.5 and 1.3.6),* no increases were reported in the number of patients with whom GPs discussed PA, with 43% of GPs in 1997 and 47% in 2000 reporting discussing PA with at least 10 patients per week ($p = 0.41$) (van der Ploeg et al., 2007). Although there was an increase in the frequency of discussing PA in 2007 (53% of GPs reported discussing PA with ≥ 10 patients per week), this could have been due to the decline in response rate in 2007 (Buffart et al., 2009) *(Refer to Section 1.3.1).* It thus appears that increased understanding and acceptance of PA and confidence levels are only the first steps towards addressing the issue of PA promotion in general practice and future research should focus on finding more effective strategies to translate research into widespread practice to increase GPs' PA promotion practices (Buffart et al., 2009).

On the other hand, GPs in 2007 who reported attending a workshop or seminar (Continuing Professional Development [CPD]) on PA in the previous

12 months (43% of respondents) were 2.17 (95% CI 1.54 to 3.04) times more likely to discuss PA with at least 10 patients per week than those who did not (p < 0.001), meaning that CPD attendance should be encouraged among GPs and appropriate CPD opportunities created (Buffart et al., 2009). Walsh et al. (1999) also found that physicians who felt that they had adequate knowledge to prescribe exercise to healthy adults were more likely to ask about (72% vs. 49%, p = 0.004) and counsel about (48% vs. 29%, p = 0.03) exercise, meaning that it is important that initiatives to maximise GPs' knowledge of the PA required for health benefits are implemented.

1.3.5. GPs' confidence in promoting physical activity

Most studies have found that GPs confidence in promoting PA is high when it comes to providing general advice, but lower with regards to more specific advice. Bull et al. (1997) found that Australian GPs were more confident at providing general (91%) rather than specific (46%) advice on PA to patients (Bull et al., 1997). In the study by Buffart et al. (2009), the percentage of GPs who felt confident in giving general advice was 82% in 1997 and 92% in 2000 and 2007 (p < 0.001 between 1997 and 2000), whereas the percentage who felt confident in suggesting specific PA programmes was 61% in 1997, 79% in 2000 and 69% in 2007 (p = 0.02 between 1997 and 2000).

Walsh et al. (1999) found that physicians who felt confident that they were successful in changing behaviour were more likely to ask about (moderate perceived success 70% vs. no perceived success 28%, p = 0.001) and counsel about (46% vs. 20%, p = 0.05) exercise. Similarly, Saliba (2009) found that confidence in counselling was associated with reported rate of

health behaviour counselling (p = 0.001). Higher levels of confidence could be instilled through appropriate training, since in the UK while only 29% of GPs felt effective or very effective at helping patients to exercise regularly, 60% believed that they would feel this way if provided with adequate information and training (McAvoy, Kaner, Lock, Heather & Gilvarry, 1999).

1.3.6. GPs' role perception regarding physical activity promotion

Although PA promotion levels tend to be low *(Refer to Section 1.3.1)*, GPs' role perception regarding PA promotion is generally very high. In fact, the vast majority of British GPs (97%) agreed that promoting PA is important in primary care (Lawlor et al., 1999). Similarly, more than 90% of Australian GPs agreed that discussing the benefits of PA with patients is part of the GP's role (92% in 1997, 99% in 2000 and 98% in 2007) and that suggesting to patients ways to increase daily PA is part of the GP's role (91% in 1997, 98% in 2000 and 98% in 2007, $p < 0.001$ between 1997 and 2000) (Buffart et al., 2009). Slightly fewer agreed that GPs should be physically active to act as a role model for their patients (76% in 1997, 89% in 2000, 92% in 2007, $p < 0.001$ between 1997 and 2000). Conversely, only 30% of British GPs agreed that identification of physical inactivity is a very important part of their day-to-day work, in contrast to 81% and 90% who agreed that identification of hypertension and cigarette smoking, respectively, are very important parts of their work (Steptoe, Doherty, Kendrick, Rink & Hilton, 1999).

1.3.7. GPs' physical activity levels

Physically inactive doctors are less likely to provide exercise counselling to patients and provide less credible role models (Lobelo, Duperly & Frank,

2009). In fact, McKenna et al. (1998) found that GPs were more likely to promote exercise if they themselves were regular exercisers (Odds Ratio [OR] = 3.19, 95% confidence intervals [CI] 1.96 to 5.18). Walsh et al. (1999) found that more physicians who reported exercising regularly had a resting pulse rate lower than 65 than those who did not (65% vs 21%, $p < 0.001$), and having a pulse rate lower than 65 was associated with counselling more than 50% of patients about PA (51% versus 36%, $p = 0.05$). In the Women Physicians' Health Study, Frank et al. (2003) found that 49% of respondents reported exercising enough to meet the ACSM recommendations, and similarly, these respondents were more likely to counsel patients on exercise ($p = 0.004$).

The number of Maltese GPs who reported exercising regularly (daily or 2-3 times a week) was found to be lower (37%) (Sammut, 2006), which was similar to the results obtained Europe-wide, wherein 38% of GPs reported exercising regularly, and these GPs reported advising sedentary patients to perform regular PA more often than sedentary GPs ($p = 0.045$ and $p = 0.034$ in the two hypothetical scenarios) (Brotons et al., 2005). Conversely, in the study by Steptoe et al. (1999), personal exercise habits were uncorrelated with attitudes to health promotion generally and to lifestyle counselling for modification of PA in particular ($p > 0.05$). However, apart from this study, it is clear that the majority of the literature suggests that there is a relationship between GPs' PA levels and their PA promotion practices.

1.3.8. Barriers to physical activity promotion

Since the reported level of PA promotion by GPs is generally low *(Refer to Section 1.3.1)*, analysis of the barriers to PA promotion is crucial. Among the eight studies reviewed by Eakin et al. (2005), lack of time was the most common barrier, with 41%-93% of respondents in all the studies reporting it as a problem. This was followed by a perceived lack of patient interest or willingness to adhere to PA advice (seven studies, 7%-55%), lack of reimbursement or financial incentive (six studies, 12%-47%), perceived lack of practitioner knowledge, skill or training relevant to PA counselling (five studies, 12%-65%), considering other issues more important to address with patients (four studies, 7%-58%), not believing counselling could be successful (three studies, 10%-35%) and not believing exercise has been established as an important risk factor (three studies, 7%-13%) (Eakin et al., 2005).

The main barrier to implementing health promotion and preventive activities (including PA promotion) perceived by Maltese GPs was also a heavy workload and lack of time (56%) (Sammut, 2006). This was followed by problems in patients' accessibility to these activities (39%), patients doubting the effectiveness of such activities (31%), insufficient personnel training in prevention and health promotion (24%), no reimbursement (22%), lack of consensus due to discrepancies in recommendations (21%) and lack of clarity about which professional in primary care is responsible for carrying out these activities (20%) (Sammut, 2006).

These barriers need to be addressed for higher levels of PA promotion in general practice to become a reality.

1.3.9. Strategies for implementation of physical activity promotion in general practice

Various strategies for implementation of PA promotion in general practice have been proposed. Tulloch et al. (2006) reviewed the evidence of the relative effectiveness of counselling by different intervention providers (GPs, allied health professionals or a combination) for increasing PA, and concluded that while counselling by all intervention providers generated some improvements in PA behaviour, allied health professionals as adjuncts or alone produced the best results in the long term (longer than six months). Moreover, these interventions reduce time demands on GPs. Therefore, an interdisciplinary model was proposed in which GPs use their credibility and existing relationship with their patients to recommend PA behaviour change and offer referrals to an allied health professional for specialised treatment (Tulloch et al., 2006). A PA counsellor with specialised knowledge and trained in counselling strategies, who also has more time available for more intensive and effective counselling, was said to be the most appropriate.

Taylor (2003) stated that a GP is not normally in an ideal position to prescribe a tailored exercise programme due to time and training limitations and similarly proposed that a GP should give advice for a patient to increase PA and then refer the patient to an exercise professional. Such a strategy appears to have considerable hypothetical support from GPs, with 71% of U.S. physicians stating that they would refer patients to an exercise specialist if available (Walsh et al., 1999) and 47% of Australian GPs identifying referral to a qualified fitness professional as desirable practice (Bull et al., 1997).

The development of appropriate resource materials could also aid the implementation of successful PA counselling by GPs (Swinburn, Walter, Arroll, Tilyard & Russell, 1997). It is also important that counselling is part of a community-wide message at various levels (Harris & Smith, 2003). Such strategies are thought to be necessary to close the gap between what GPs are doing now and what they agree could and should be done in general practice (Bull et al., 1997).

1.4. Introduction to Malta

The Maltese archipelago, located in the Mediterranean Sea, just south of Sicily, consists of three islands: Malta, Gozo and Comino (Department of Information – Malta [DOI], 2010). The largest island of the group is Malta, from which the archipelago takes its name, and Valletta is the capital city (DOI, 2010). The area of the Maltese Islands is 316 km^2 (DOI, 2010) and the total population of the Maltese Islands is 412,970 (National Statistics Office, Malta, 2010). Malta's climate is Mediterranean, with an average yearly temperature of around 22°C (Abela, 2007).

Figure 1: *Map of Malta*
Source: *http://www.lonelyplanet.com/maps/europe/malta/*

1.5. Recommended physical activity for Maltese adults

The PA recommendation for Maltese adults states that they should take part in at least 30 minutes of moderate-intensity aerobic activity daily, which can be accumulated in bouts of at least 10 minutes (Health Promotion and Disease Prevention Department [Malta], 2008). Figure 2 illustrates the Maltese Physical Activity Pyramid, which encourages people to be more active and reduce sedentary time.

Figure 2: *Maltese Physical Activity Pyramid*
Source: *Health Promotion and Disease Prevention Department (2008)*

1.6. Physical activity levels, obesity and diabetes in Malta

In 2005, 78% of the adult population in Malta was classed as inactive, the highest percentage among a number of European countries and a substantially higher percentage than the EU average (41%) *(Figure 3)* (European Commission [EC], 2006).

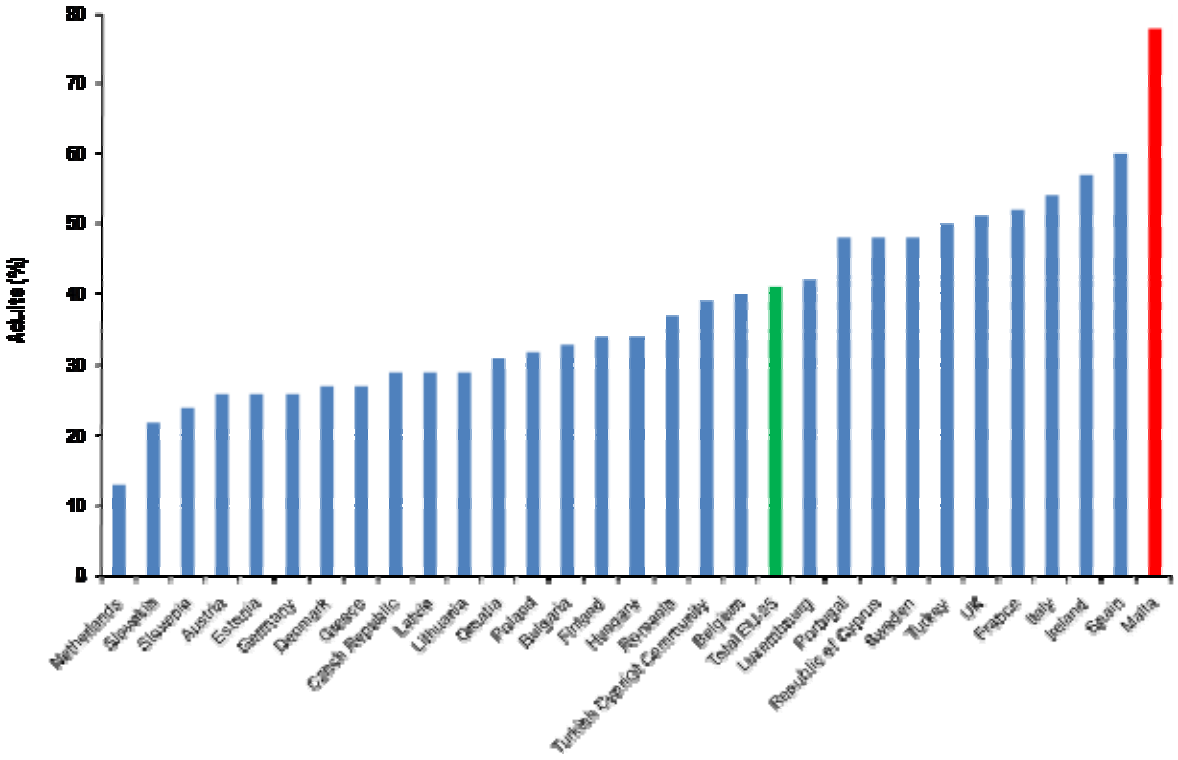

Figure 3: *Percentage of adults who do no moderate physical activity in a typical week, 2005, selected European countries*
Source: *European Commission (2006)*

However, the European Health Interview Survey carried out in Malta in 2008 indicated that compared to 2002, the proportion of respondents reporting moderate PA has more than doubled (16.6% in 2008 vs. 7.1% in 2002), while the proportion reporting high PA remained relatively the same *(Figure 4)* (Department of Health Information and Research [DHIR], 2008). Nevertheless, at 56.5%, the proportion reporting a low level of PA is still very high (DHIR, 2008).

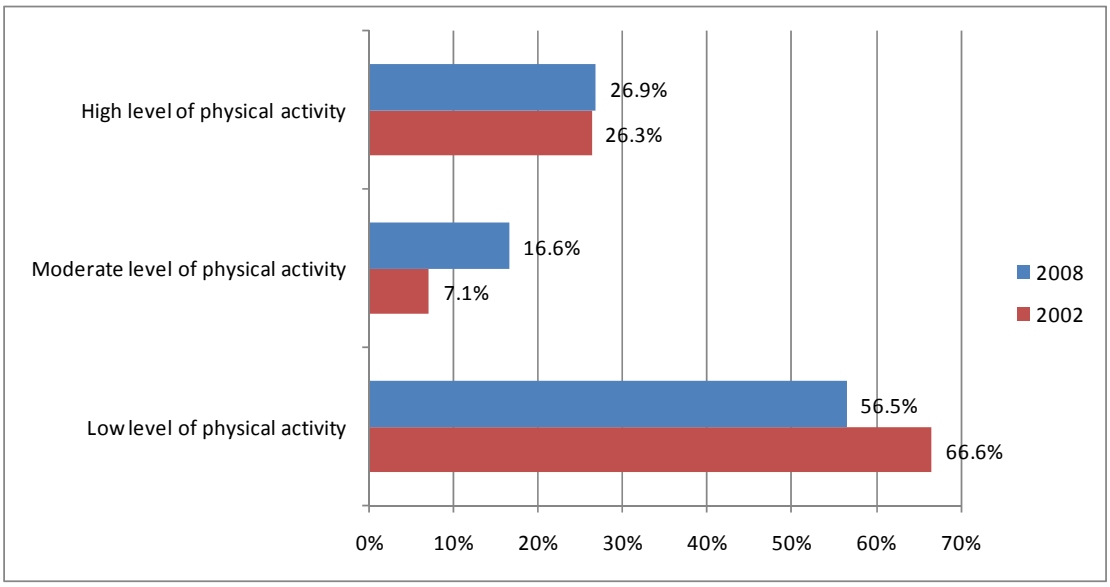

Figure 4: *Level of physical activity among Maltese adults in 2002 and 2008*
Source: *DHIR (2008)*

Furthermore, the obesity rate among Maltese adults (22.3%) is the third highest among EU countries and is substantially higher than the EU average of 15.5% *(Figure 5)* (OECD, 2010). In addition to the obesity rate, a further 36% of the adult population are overweight (DHIR, 2008). Moreover, the prevalence estimate of diabetes among Maltese adults aged 20-79 years (6.8%) is the seventh highest among EU countries and is slightly higher than the EU average of 6.5% *(Figure 6)* (OECD, 2010).

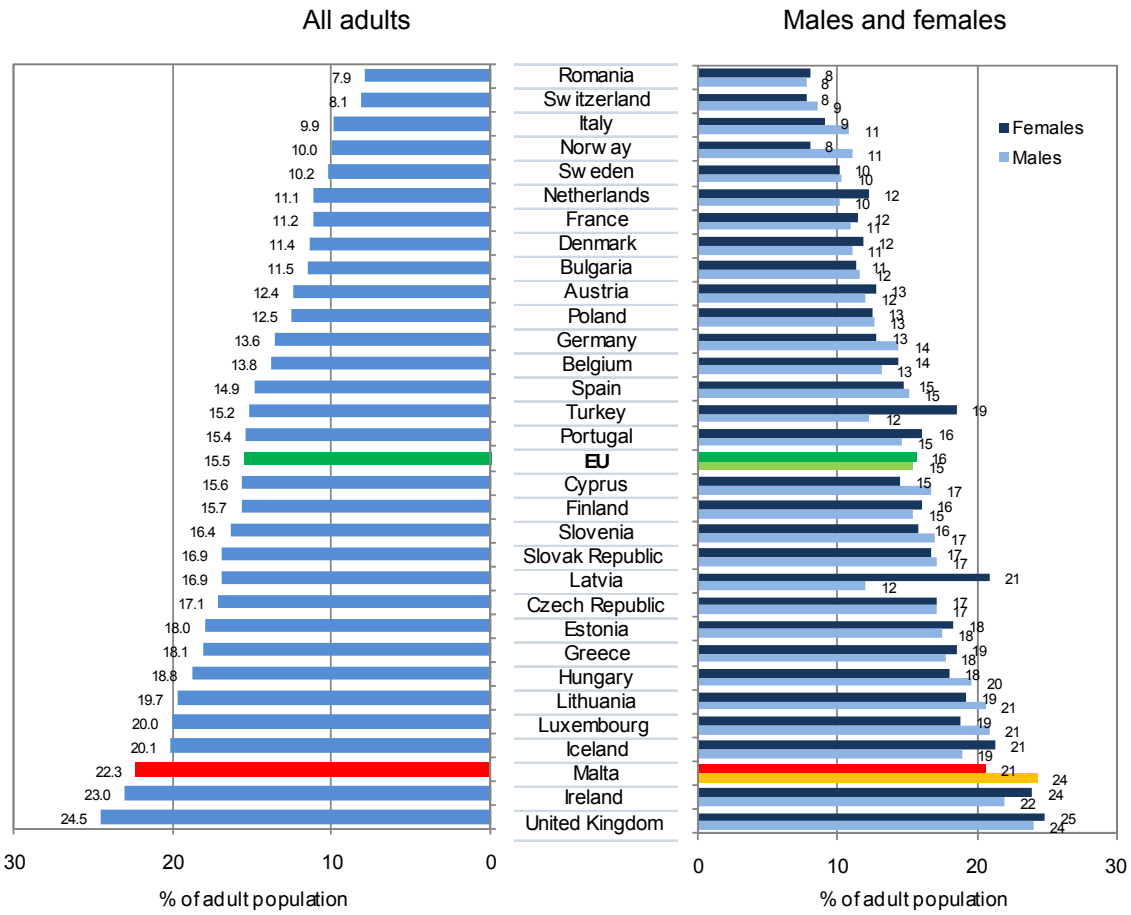

Figure 5: *Obesity rates among adults, 2008 (or nearest year available)*
Source: *OECD (2010)*

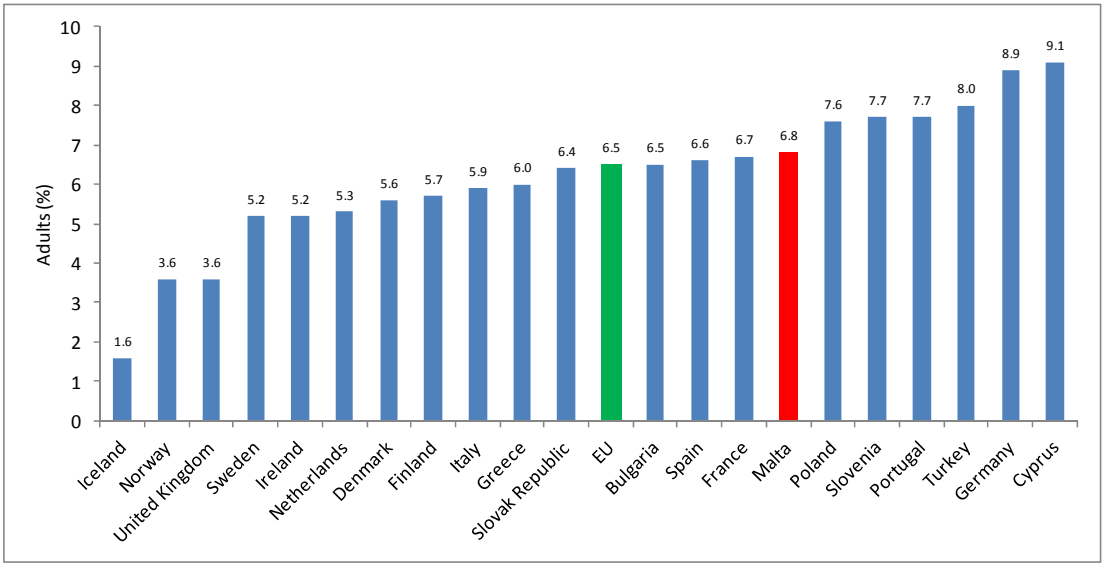

Figure 6: *Prevalence estimates of diabetes, adults aged 20-79 years, 2010*
Source: *OECD (2010)*

1.7. Primary health care in Malta

Primary health care in Malta is provided by the state and the private sector, as shown in Table 2. The state primary care service is offered free-of-charge, whereas private GPs operate on a fee-for-service basis (Sammut, 2000).

Table 2: *State and private primary health care services in Malta*

Primary Health Care	
State	***Private***
• **Health Centres** o General Practitioner Service (also in Local Clinics) o Specialist and Paramedical Services o Investigative Services o Preventive Services • **Community** o Domiciliary Nursing o School Health Services	• **Solo General Practitioners** • **Company Doctor Groups** • **Nursing and other Health Care Professional Services**

Source: *Sammut (2000)*

The National Health Interview Survey conducted in 2002 indicated that in the previous 12 months, 76% of respondents had visited a family, health centre, casualty or outpatient doctor (excluding contacts during hospitalisation) (Department of Health Information, 2002). GPs/Health centres were found to be the most important source of health information in Malta in 2008 (83%) *(Figure 7)* (DHIR, 2008).

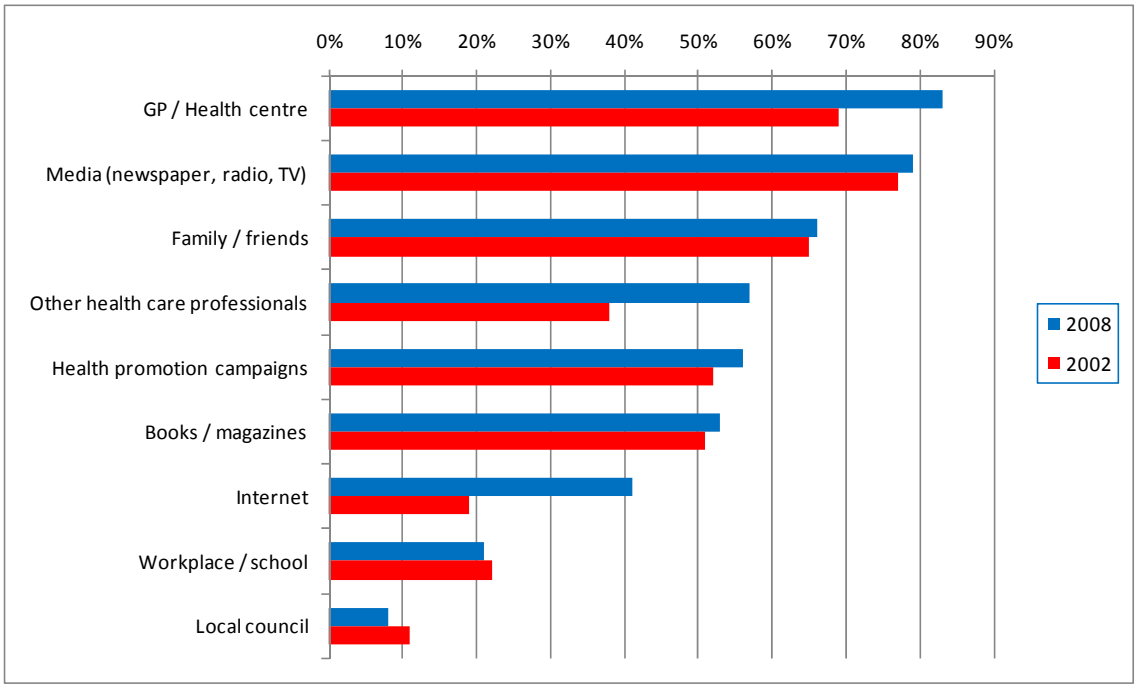

Figure 7: *Sources of health information for Maltese adults*
Source: *DHIR (2008)*

1.8. Aim, objectives, research questions, hypotheses and potential benefits of this research project

"Stimulating a physically active lifestyle is public health's best buy" (van Mechelen, 1997, p. 264). This is particularly important in Malta due to the high rates of physical inactivity and obesity. Furthermore, since a large proportion of the Maltese population visit a GP each year and since GPs are seen as a credible source of health information, PA promotion by Maltese GPs could have a significant public health impact. Thus, investigating PA promotion among Maltese GPs is very important. However, it appears that apart from a study which investigated European (including Maltese) GPs' attitudes and knowledge of prevention and health promotion in general (Brotons et al., 2005; Sammut, 2006) and a study which looked at Maltese GPs' health behaviour counselling (Saliba, 2009), with both studies also investigating some aspects of PA, no studies specifically regarding PA promotion in general practice have been conducted in Malta. Therefore,

awareness of the potential impact of PA promotion in general practice in Malta is not clear.

The aim of this research project is to investigate the promotion of PA in general practice in Malta, by analysing Maltese GPs' beliefs, attitudes and practices.

The objectives of the study are:

i. To assess and provide an overview of Maltese GPs' knowledge, confidence, role perception and perceived barriers and feasibility with regard to promoting a physically active lifestyle with their patients.
ii. To assess and provide an overview of Maltese GPs' self-reported practice of promoting PA, including whether they promote PA for primary prevention, secondary prevention or both.

The research questions to be addressed are:

i. How often do Maltese GPs encourage patients to have a more physically active lifestyle?
ii. Are Maltese GPs more likely to promote PA if they perceive it as relevant to the patient's condition, rather than routinely with all patients?
iii. What proportion of Maltese GPs know the national PA recommendation, and do GPs who know the recommendation promote PA more regularly than those who do not?
iv. How much do Maltese GPs know about PA required for health benefits, and do GPs with high knowledge levels promote PA more regularly than those with lower knowledge levels?

v. How confident are Maltese GPs in promoting PA, and do GPs with high confidence levels promote PA more regularly than those with lower confidence levels?

vi. How do Maltese GPs perceive their role with regards to PA promotion?

vii. How physically active are Maltese GPs, and do GPs who are more physically active promote PA more regularly than those who are less physically active?

viii. What barriers prevent Maltese GPs from promoting PA with their patients?

ix. What types of PA promotion do Maltese GPs consider feasible to deliver to their patients?

Several studies have reported that the rate of PA promotion in general practice is low (Bull et al., 1995; Walsh et al., 1999; Kennedy & Meeuwisse, 2003; Buffart et al., 2009). Therefore, the primary hypothesis to be addressed is that PA promotion by Maltese GPs is generally low.

The rationale for the secondary hypotheses to be addressed and the hypotheses themselves are outlined below:

i. Several studies have found that GPs are more likely to promote PA if they perceive it as relevant to the patient's condition (secondary prevention), rather than routinely with all patients (primary prevention) (Bull et al., 1995; Lawlor et al., 1999; Douglas et al., 2006). The second hypothesis to be tested in this study is thus that Maltese GPs are more likely to promote PA as secondary, rather than primary, prevention.

ii. Walsh et al. (1999) found that physicians who were familiar with the PA recommendations were more likely to engage in regular PA counselling. Another hypothesis to be tested in this study is that there is a relationship between Maltese GPs' knowledge of the national PA recommendations and their PA promotion practices.

iii. Walsh et al. (1999) also found that physicians who felt that they had adequate exercise knowledge were more likely to counsel about exercise. This study will test the hypothesis that there is a relationship between Maltese GPs' knowledge of PA required for health benefits and their PA promotion practices.

iv. Saliba (2009) found a relationship between confidence in counselling and rate of health behaviour counselling and Walsh et al. (1999) found that physicians who felt confident in their success in changing behaviour were more likely to counsel about exercise. This study will test the hypothesis that there is a relationship between Maltese GPs' confidence in promoting PA and their PA promotion practices.

v. Several studies have found that GPs are more likely to promote PA if they are physically active themselves (McKenna et al., 1998; Walsh et al., 1999; Frank et al., 2003; Brotons et al., 2005). This study will thus test the hypothesis that there is a relationship between Maltese GPs' PA levels and their PA promotion practices.

This study should thus lead to an understanding of Maltese GPs' beliefs, attitudes and practices of PA promotion. In light of the high rates of physical inactivity and obesity in Malta and the consensus that PA promotion in general practice could have a significant public health impact, this could have important implications.

Chapter 2: Methodology

2.1. Participants

Participants were recruited from GPs registered with the Medical Council of Malta, with the inclusion criterion being GPs who practise in Malta. GPs' names and addresses were obtained from the Medical Council Registers on the Ministry of Health, the Elderly and Community Care website (https://ehealth.gov.mt/HealthPortal/default.aspx), which is freely available to the public. All Maltese GPs were invited to participate in the study due to the fact that they are small in number. Although 321 GPs are registered with the Medical Council of Malta, seven GPs were excluded from the study since they do not currently reside in Malta, while a further 12 GPs could not be included since no contact address was available. Therefore, a total of 302 GPs were invited to participate in the study.

Ethical approval was obtained from the Faculty of Applied Sciences Research Ethics Committee at the University of Chester, UK *(Refer to Appendix 1)*, as well as from the University of Malta Research Ethics Committee, Malta *(Refer to Appendix 2).* Participants provided consent by choosing to complete and return the questionnaire, which was sent to them together with a recruitment letter and information sheet explaining the purpose of the study *(Refer to Appendices 3-5)*.

2.2. Study design

This study involved a postal survey of Maltese GPs. The data was collected using a slightly modified version of a questionnaire about PA in general practice, which was available as an appendix to a study by Shirley, van der Ploeg and Bauman (2010). Although this particular study examined PA promotion in the physical therapy setting, the questionnaire was originally designed for studies of PA promotion in general practice and had previously been used in two such studies (van der Ploeg et al., 2007; Buffart et al., 2009). The questionnaire was designed based on focus groups and initial pilot testing among GPs (Shirley et al., 2010).

The reason that the questionnaire was modified slightly was to make it more appropriate to this study. In the first question regarding how often GPs encouraged their patients to have a more physically active lifestyle in the previous month, the answers were modified since it was felt that the number of patients in the answers provided was too low. “Rarely, only 1-2 patients” was changed to “1-9 patients”, “Sometimes, perhaps 3-5 patients” to “10-19 patients”, “Often, perhaps 6-9 patients” to “20-29 patients” and “More often, 10 or more patients” to “30 or more patients”.

The third question regarding how often GPs provide PA advice to patients with various conditions was added on from another questionnaire used in another similar study (Douglas et al., 2006), which had also been pilot tested prior to the study, to address the hypothesis of the current study that Maltese GPs are more likely to promote PA as secondary, rather than primary,

prevention. The answers to the sixth question “In what kind of practice do you work?” were modified to reflect the types of general practice in Malta.

The questionnaire covered the following topics: knowledge about the amount of PA required for health benefits in adults (four items), perception of the role of GPs in PA promotion (three items), confidence in promoting PA (two items), frequency of providing PA advice to patients with various conditions (seven items), barriers to PA promotion (seven items), and feasibility of different PA promotion strategies (five items). All items were scored on a five-point Likert scale (“strongly agree” to “strongly disagree”, “never” to “very often” or “highly feasible” to “totally unfeasible”). GPs were also asked about the number of patients they had encouraged to lead a more physically active lifestyle in the previous month and whether they could describe the national PA recommendation for Maltese adults. General demographic data were recorded and participants were asked how they would rate their own PA levels compared with those of other Maltese people of the same sex and age on a five-point scale (ranging from “much more active” to “much less active”), which has been shown to determine relative proportions of active and inactive people reliably (Shirley et al., 2010). GPs were also asked for approximately how long they are physically active each week, but several of the responses to this question (which ranged from 0-50 hours per week) did not seem to relate to the other question asking GPs to compare their PA levels to other Maltese people’s PA levels. Therefore, it was decided that this question, which was added to the original questionnaire following a pilot study *(details provided in Section 2.3)* and which had therefore not been

validated, was not worded correctly. Thus, the answers were not used in the data analysis.

The GPs' responses to the question about the number of patients they encouraged to lead a more physically active lifestyle in the previous month were used as the variable for frequency of promoting PA (GPs' PA promotion practices). For GPs who reported encouraging less than 30 patients, the maximum theoretical percentage of patients whom they encouraged was also calculated. This was done by dividing the maximum number in their answer to the number of patients they encouraged in a month by the average number of patients seen each month. This was not possible to calculate for those GPs who reported encouraging more than 30 patients, since there was no upper limit to this response.

The four knowledge items, three role perception items and two confidence items were used to establish an overall knowledge, role perception and confidence score for each GP, depending on whether or not they answered the item correctly. An answer of "not sure" was marked as an incorrect answer. Apart from these scores giving a picture of Maltese GPs' knowledge, role perception and confidence, the overall knowledge score was used as one of the variables for Maltese GPs' knowledge of PA required for health benefits, and their responses to each statement regarding knowledge were also regarded as four separate knowledge variables. Knowledge or lack of knowledge of the national PA recommendation for Maltese adults was the variable for knowledge of PA recommendations. The overall confidence score was used as the variable for Maltese GPs' confidence in promoting PA,

and their confidence in giving general advice about a physically active lifestyle and confidence in suggesting specific PA programmes were also regarded as two separate confidence variables. The frequency of providing PA advice to patients with various conditions was used to establish whether Maltese GPs are more likely to promote PA as secondary, rather than primary prevention. Finally, ratings of PA levels in comparison to other Maltese people of the same sex and age were used as the variable for Maltese GPs' PA levels.

2.3. Procedures

Questionnaires were sent to 302 Maltese GPs in May 2011 *(Refer to Section 2.1)*. The questionnaire was sent together with a recruitment letter and information sheet, which explained the purpose of the research project and provided information on further issues such as confidentiality, voluntary participation and ability to withdraw at any time *(Refer to Appendices 4 and 5)*. All questionnaires were anonymous. A prepaid return envelope was included with the questionnaire to facilitate the returning of completed questionnaires and maximise the response rate. Furthermore, a second letter was sent four weeks after the original mailing to remind the GPs who had not yet responded.

A small pilot study involving four Maltese doctors was performed. This pilot study confirmed that the questionnaire took approximately five minutes to complete and certain minor adaptations from the original questionnaire were made. In the question about barriers to PA promotion, an additional barrier about a lack of suitably qualified exercise professionals was included, since

the doctors in the pilot study pointed out that this could be a barrier for some GPs in Malta. To follow this up, in the question related to the types of PA promotion which would be feasible for GPs to deliver to patients, referral to a suitably qualified exercise professional was included as another type of PA promotion. Since this referral practice does not currently occur in Malta, establishing GPs' views about it was considered important.

The final adaptation following the pilot study was the addition of a sub-part to the eighth question about the GPs' own PA levels. Apart from the question asking GPs to rate their PA levels in comparison to other Maltese people of the same sex and age, another question was added asking them for approximately how long they are physically active each week. However, as explained in Section 2.2, this question was deemed inaccurate and excluded from the analysis.

2.4. Statistical Analyses

The data obtained was analysed using Predictive Analytics Software (PASW), Version 18.0 (formerly Statistical Package for the Social Sciences [SPSS]).

Descriptive analysis was used to provide a basic quantitative description of the personal characteristics of respondents. The gender ratio of non-responders was compared to that of the GPs who completed a questionnaire in order to give a slight indication of how representative the GP sample was. This was done by means of a Chi-Squared (X^2) Test for Association.

Since the data was primarily ordinal (from Likert scales), the descriptive statistics used were the median and the range. Although the level of measurement was ratio in the case of the overall knowledge, confidence and role scores, and the number of years in practice, number of patients seen each month and hours worked per week, normality tests were conducted and the Shapiro-Wilk statistic indicated that the data was not normally distributed for any of these variables. Therefore the median and range were used for these variables also (Coakes & Steed, 2007).

No parametric tests were used since the lowest level of data in each test was nominal or ordinal. The appropriate statistical analysis to test the null hypothesis that there is no significant relationship between two variables when the lowest level of data is nominal data is the Chi-Squared Test for Association, whereas the appropriate statistical analysis to test the null hypothesis that there is no significant relationship between two variables when the lowest level of data is ordinal data is Spearman's Rank Correlation Coefficient (Coakes & Steed, 2007). Therefore, the Chi-Squared Test for Association and Spearman's Rank Correlation Coefficient were used to test the hypotheses of this study, depending on the level of data of the variables being tested.

One of the assumptions which needs to be addressed before conducting a Chi-Squared Test is the size of expected frequencies, whereby the lowest expected frequency required is five (Coakes & Steed, 2007). In order to meet this assumption, when Chi-Squared tests were used, the question on numbers of patients encouraged to increase PA each month was

dichotomised at 30 or more per month and fewer than 30 per month. In order to make presentation of results clearer, in some instances the responses to the questions on knowledge, role perception and confidence were also dichotomised by combining the two "agree" options and combining the "neutral" with the two "disagree" options.

A Chi-Squared Test for Association was used to establish whether there is a relationship between GPs' knowledge of the PA recommendation for Maltese adults and the number of patients they encouraged to increase PA in the previous month (frequency of promoting PA). Chi-Squared Tests for Association were also used to compare the responses of GPs who know the PA recommendation to those of GPs who do not, as well as the responses of GPs who promoted PA to less than 30 patients in the previous month to those of GPs who promoted PA to at least 30 patients, by means of crosstabulations. Spearman's Rank Correlation Coefficient tests were used to establish whether there is a relationship between GPs' overall knowledge score, GPs' overall confidence score and GPs' ratings of their PA levels compared to other Maltese people of the same sex/age on the one hand, and their frequency of promoting PA on the other. Spearman's Rank Correlation Coefficient tests were also used to establish whether there is a relationship between GPs' responses to each individual statement related to knowledge and confidence and frequency of promoting PA.

Any values of p below 0.05 were considered to be statistically significant (Coakes & Steed, 2007). The strength of relationships was interpreted by means of the following table suggested by Cohen and Holliday (1996):

Table 3: *Descriptive interpretation of correlation coefficients (r)*

r	meaning
0.00 to 0.19	a very low correlation
0.20 to 0.39	a low correlation
0.40 to 0.69	a modest correlation
0.70 to 0.89	a high correlation
0.90 to 1.00	a very high correlation

Source: *Cohen & Holliday (1996)*

While the *r* value was obtained from Spearman's Rank Correlation Coefficient tests, in the case of the Chi-Squared Tests for Association, the Cramer's V statistic was used as a measure for effect size and was interpreted by means of the same table (Kinnear & Gray, 2010).

The following variables were checked for potential confounding or effect modification: average number of patients seen each week, number of years in practice, sex, age, usual number of hours worked each week and type of general practice, similarly to the study by Buffart et al. (2009).

Chapter 3: Results

3.1. Demographics

A total of 157 questionnaires were returned, of which 128 were received after the initial mailing and 29 following the reminder. One of the questionnaires was discarded as half of it had been left out, resulting in 156 valid questionnaires. After six GPs who have retired or are not currently practising were removed from the denominator, this resulted in a corrected response rate of 53%. The personal characteristics of the participating GPs are described in Table 4. The Chi-Squared Test of Association indicated that the gender ratio (incidence of males versus females) of GPs who completed a questionnaire was not significantly higher than that of the non-responders (76% males [responders] vs 71% males [non-responders]) (p = 0.278) *(Refer to Tables A1 and A2 in Appendix 6)*. The variables which were checked (average number of patients seen each week, number of years in practice, sex, age, usual number of hours worked each week and type of general practice) did not appear to be confounders or effect modifiers.

Table 4: *Personal characteristics of the GPs who completed a questionnaire*

Variable	Study Sample (*n* = 156)
Gender, *n* (%)	
Male	119 (76%)
Female	37 (24%)
Age (y), *n* (%) (*n* = 155)	
< 35	7 (4%)
35-44	34 (22%)
45-54	76 (49%)
≥ 55	38 (25%)
Type of practice, *n* (%) *(38 GPs in more than one type of practice)*	
Private Practice	128 (65%)
Private Group Practice	6 (3%)
Private Hospital	2 (1%)
Public Hospital	14 (7%)
Public Health-Centre	47 (24%)
Years in practice, median (min - max)	25 yr (4 - 56 yr)
Number of patients seen each month, median (min - max)	433 patients (52 - 1,560 patients)
Hours worked per week, median (min - max)	48 hr (8 - 85 hr)
Completed a course or special training related to exercise science or exercise counselling, *n* (%)	11 (7%)

3.2. Level of physical activity promotion

Figure 8 shows how many patients GPs encouraged to lead a more physically active lifestyle in the previous month, with the median response being “Often, 20-29 patients” (Minimum “Rarely, 1-9 patients”, Maximum “More often, 30 or more patients”).

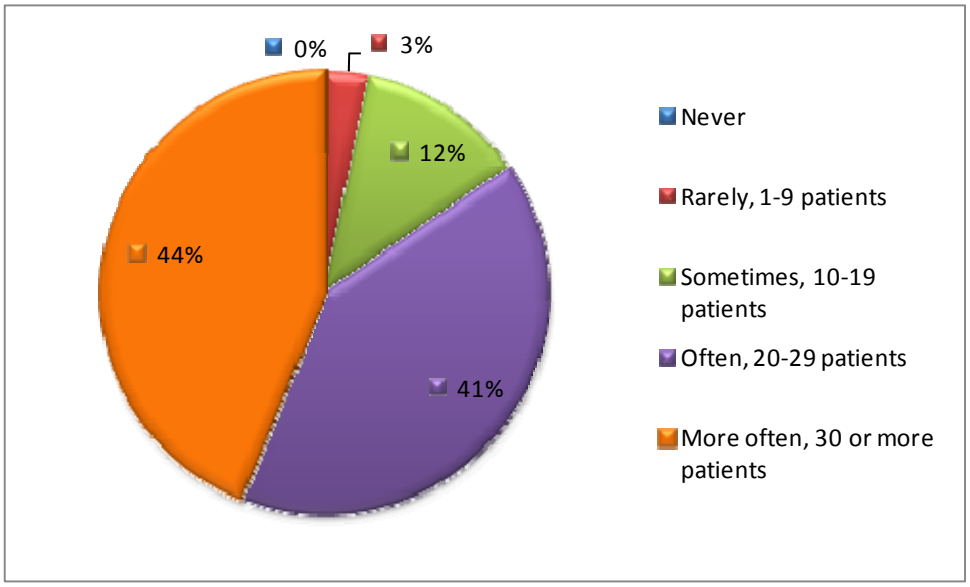

Figure 8: *How often GPs encouraged patients to a have more physically active lifestyle in the previous month (n = 155)*

Only 44% of GPs reported encouraging 30 or more patients to lead a more physically active lifestyle in the previous month. Of the remaining 56% of GPs (*n* = 87) who encouraged less than 30 patients, 82 provided information about the average number of patients seen each week. Thus, the maximum theoretical percentage of patients encouraged to increase PA in the previous month was calculated for these GPs, which is depicted in Figure 9. The majority (66%) of these GPs encouraged less than 10% of their patients to increase PA in the previous month, while only one GP encouraged more than 30% (maximum theoretical percentage – 56% of patients).

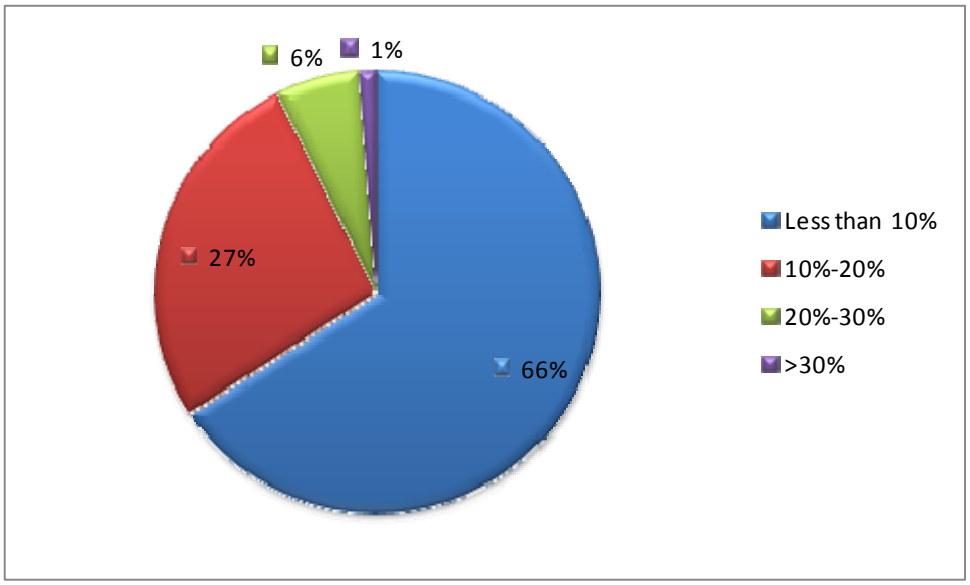

Figure 9: *Percentage of patients encouraged by GPs to have a more physically active lifestyle in the previous month (of those GPs who encouraged < 30 patients) (n = 82)*

Therefore, 52% of all respondents encouraged less than 30% of patients to increase PA in the previous month (35% encouraged less than 10%, 14% encouraged 10-20% and 3% encouraged 20-30%). It is not possible to establish the percentage of patients encouraged to increase PA for the GPs who did not provide information about the average number of patients seen each week and for the 44% of respondents who encouraged more than 30 patients to increase PA in the previous month.

3.3. Routine promotion of physical activity versus promotion as secondary prevention

Figure 10 illustrates how often GPs provide PA advice to patients with various conditions. The largest percentage of GPs provide PA advice often or very often to diabetic patients (99%; median “very often”), overweight patients (97%; median “very often”), patients with hypercholesterolemia (96%; median “very often”) and hypertensive patients (90%; median “very often”). A smaller percentage of GPs provide PA advice often or very often to

patients with known IHD (79%; median “often”). However, the percentage of GPs who provide advice to sedentary but healthy patients often or very often is substantially lower (70%; median “often”) than all the other conditions, apart from depression (67%; median “often”). The percentage of GPs who provide PA advice to sedentary patients very often (25%) is lowest out of all the conditions, which is in sharp contrast to the 76%, 75% and 73% of GPs who provide PA advice very often to diabetic patients, overweight patients and patients with hypercholesterolemia respectively. Furthermore, whereas none of the GPs reported rarely providing PA advice to overweight or diabetic patients, 8% of GPs reported rarely providing advice to sedentary but otherwise healthy patients (1% for patients with hypercholesterolemia, 2% for hypertensive patients, 4% for patients with known IHD and 9% for depressed patients). None of the GPs reported never providing PA advice to any of the categories of patients, apart from depressed patients (1%).

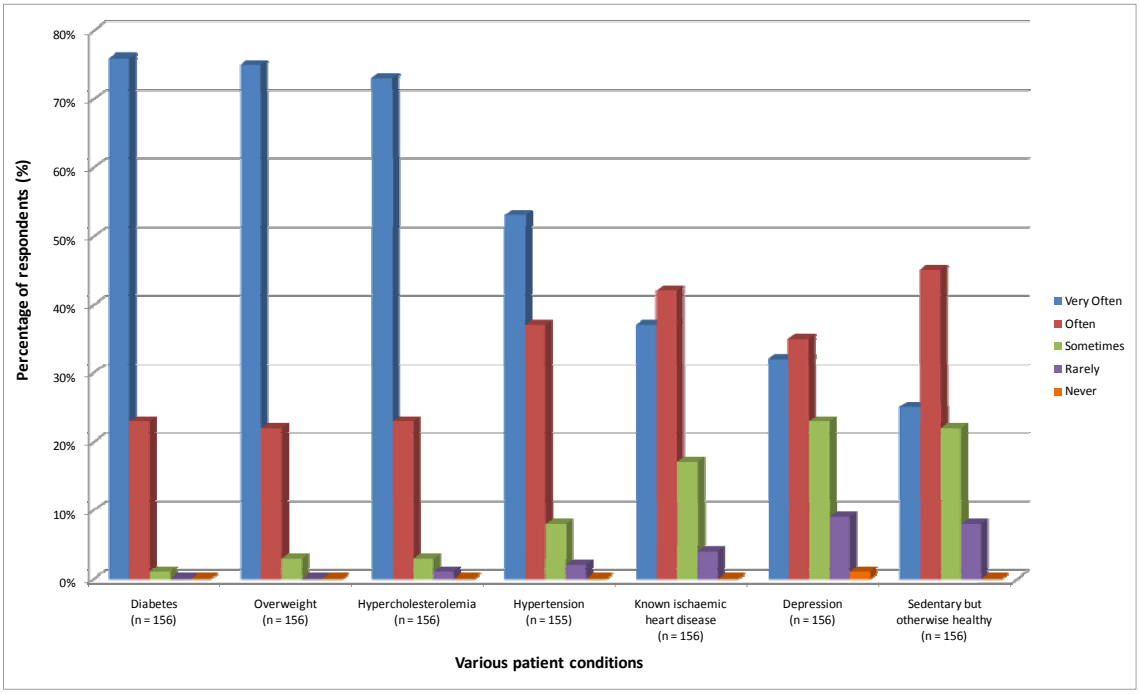

Figure 10: *How often GPs provide PA advice to patients with various conditions*

3.4. GPs' knowledge of the physical activity recommendations

Figure 11 shows that only 10% of respondents could cite the national PA recommendation specifically for Maltese adults (30 minutes of moderate PA daily), while 9% cited the guidelines recommended by UK publications (30 minutes of moderate PA five times a week). These 10% and 9% of respondents were grouped together as knowing the PA recommendations (19%), since it is understandable that a substantial number of Maltese GPs cited the UK guidelines rather than the Maltese ones, due to the great influence of British media, books and journals in Malta. However, 81% did not know either recommendation.

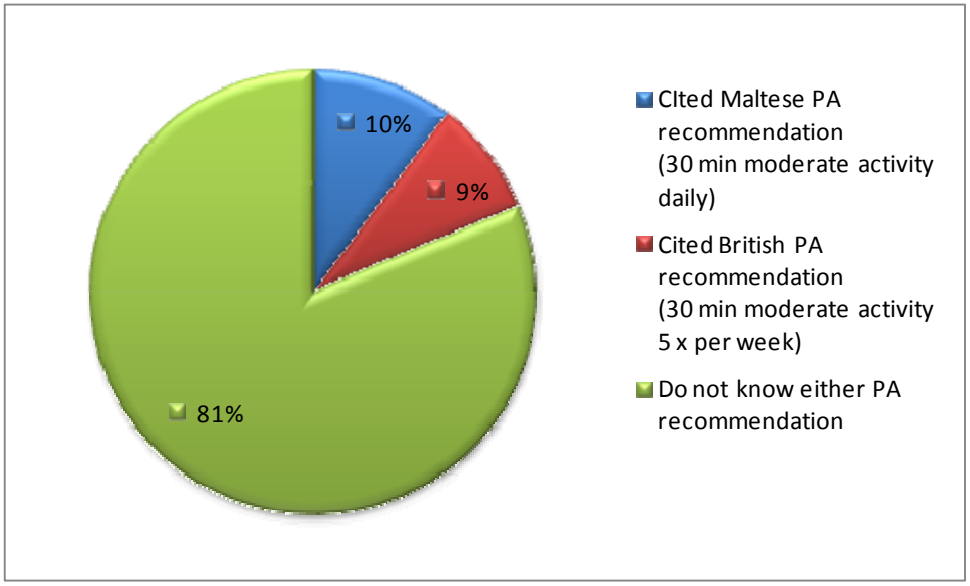

Figure 11: *Percentage of GPs who know the national PA recommendation for Maltese adults (n = 155)*

The Chi-Squared Test for Association indicated that GPs who know the PA recommendations are somewhat more likely to encourage PA to 30 or more patients in a month than those who do not know the recommendations (59% of GPs who know the recommendations vs. 41% of GPs who do not), as

illustrated in Figure 12. However, the relationship between knowledge of the PA recommendation and frequency of promoting PA did not achieve significance (p = 0.082, Cramer's V = 0.140).

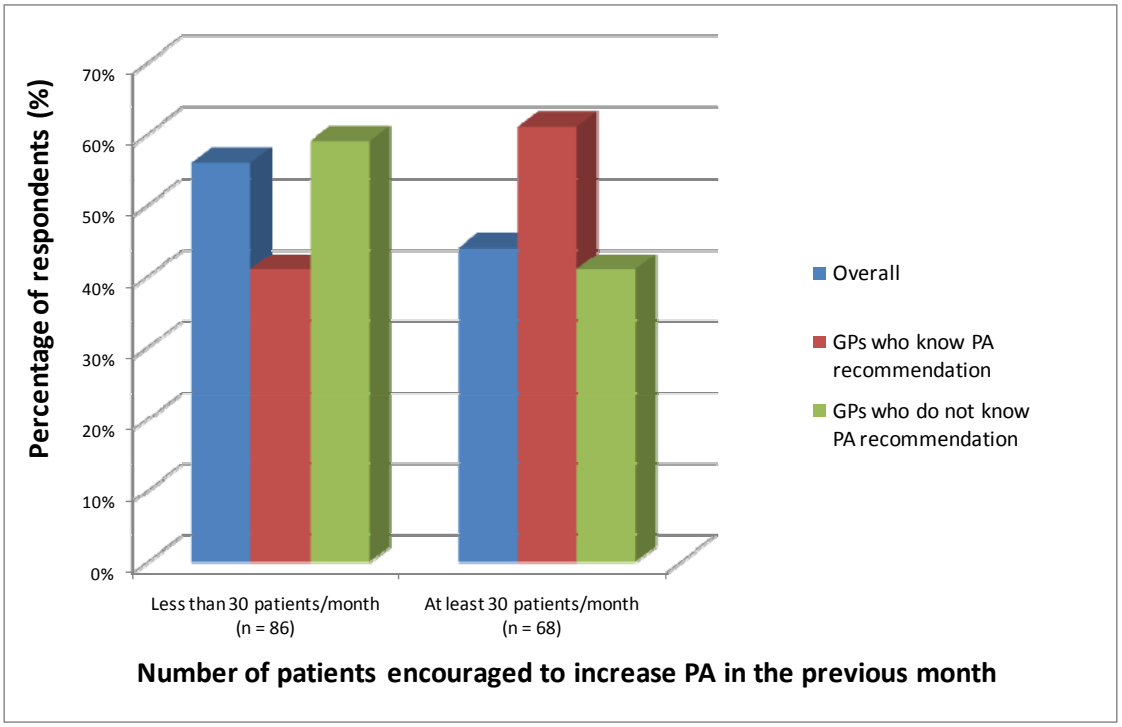

Figure 12: *Number of patients GPs who know or do not know the PA recommendation encouraged to increase PA in the previous month*

3.5. GPs' knowledge of physical activity required for health benefits

Figure 13 illustrates the GPs' responses to the four statements related to knowledge, while Figure 14 illustrates whether the GPs answered these statements correctly overall and divided into two groups depending on whether or not they know the PA recommendations. Only 39% of respondents agreed (agree/strongly agree) that taking the stairs at work and generally being more active each day is enough PA to improve health (median "disagree") and less of the GPs who know the PA recommendation answered this statement correctly (35% agree/strongly agree) than GPs who

do not know the PA recommendation (39%). On the other hand, the majority of GPs agreed that half an hour of walking on most days is all the exercise that is needed for good health (79%; median "agree") and that taking several short walks of 10 minutes each on most days is better than one round of golf per week for good health (74%; median "agree"). A larger percentage of GPs who know the PA recommendation answered these statements correctly (86% agree/strongly agree vs. 77% and 76% agree/strongly agree vs. 75% respectively). Only 25% of GPs agreed that exercise that is good for health must make you puff and pant (median "disagree"), and a smaller percentage of the GPs who know the PA recommendation answered this statement correctly (55% disagree/strongly disagree vs. 65%). Figure 15 shows the GPs' overall knowledge score based on these four statements, with the median score being three out of a maximum score of four (minimum 0, maximum 4).

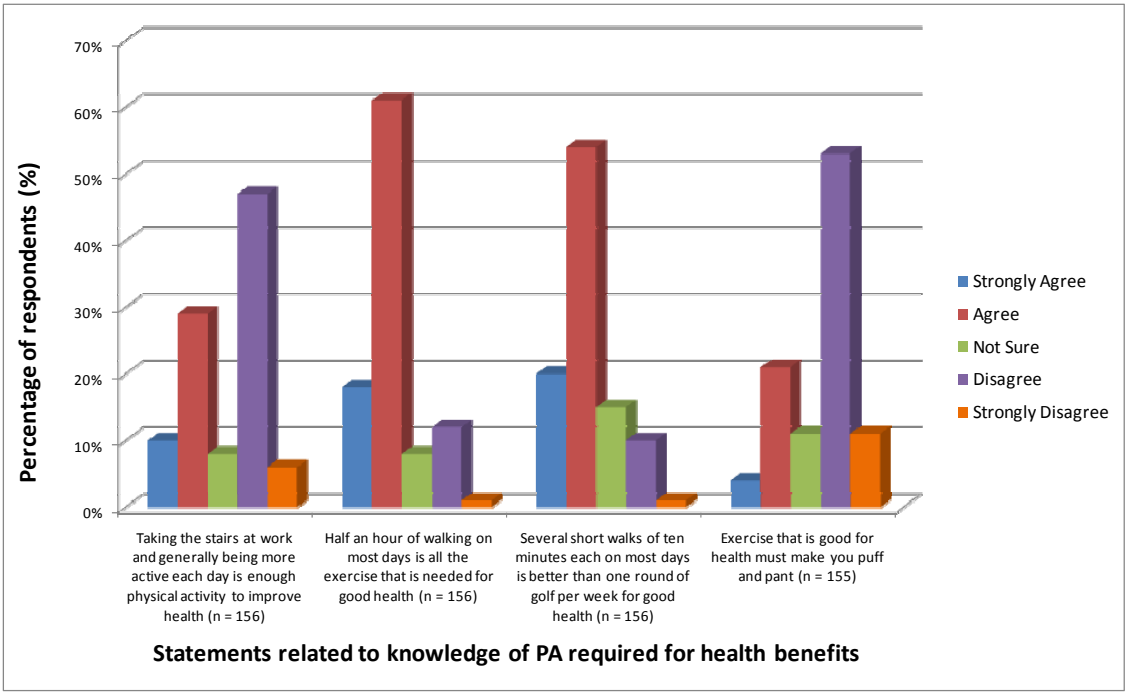

Figure 13: *GPs' responses to four statements related to knowledge of PA required for health benefits*

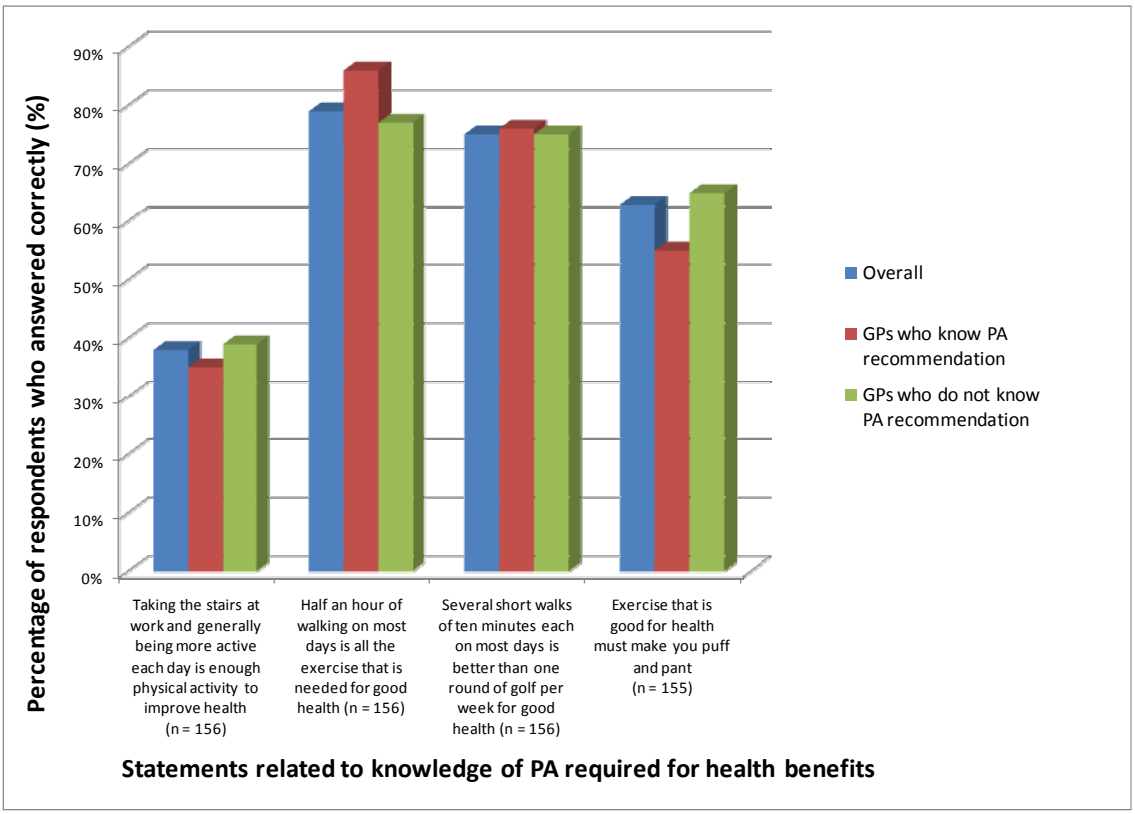

Figure 14: *Percentage of GPs who know or do not know the PA recommendations who answered statements related to knowledge correctly*

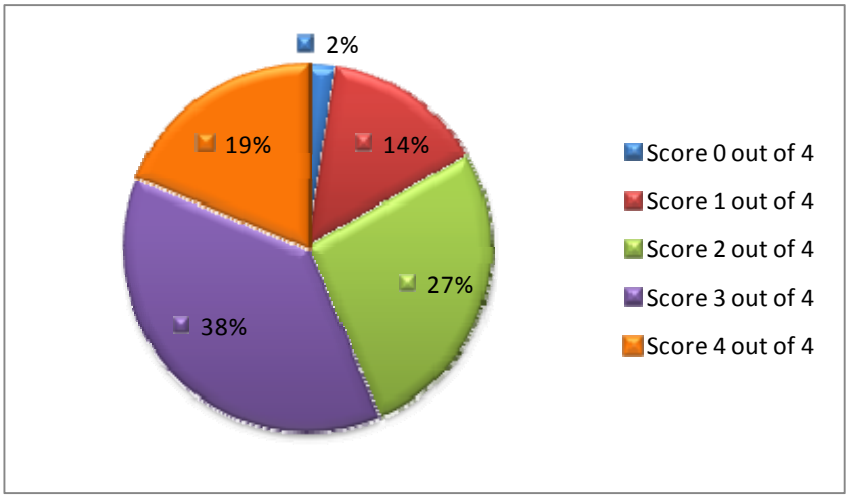

Figure 15: *GPs' knowledge score based on four statements to test their knowledge (n = 156)*

The Spearman's Rank Correlation Coefficient indicated that there is no relationship between GPs' overall knowledge score and frequency of promoting PA (p = 0.993, r = 0.001) *(Refer to Table A3 in Appendix 6)*. The

Spearman's Rank Correlation Coefficient tests also indicated that there is no relationship between GPs' responses to any of the statements related to knowledge of PA required for health benefits and frequency of promoting PA ($0.128 \leq p \leq 0.901$; $-0.060 \leq r \leq 0.123$) *(Refer to Tables A4-A7 in Appendix 6)*.

Figure 16 illustrates the percentage of GPs who answered the statements related to knowledge of PA required for health benefits correctly overall and divided into two groups depending on whether they promoted PA to less than 30 patients or at least 30 patients in the previous month. A slightly greater percentage of GPs who promoted PA to at least 30 patients answered three of the statements correctly than GPs who promoted PA to less than 30 patients (41% vs. 36% about generally being more active each day leading to health benefits; 78% vs. 74% about several 10 minute walks most days being better for health than one longer session per week and 65% vs. 63% about the necessity of vigorous activity for health). However, in the case of the statement about half an hour of walking on most days being all the exercise required for good health, less GPs who promoted PA to at least 30 patients answered the statement correctly (74% vs. 83%).

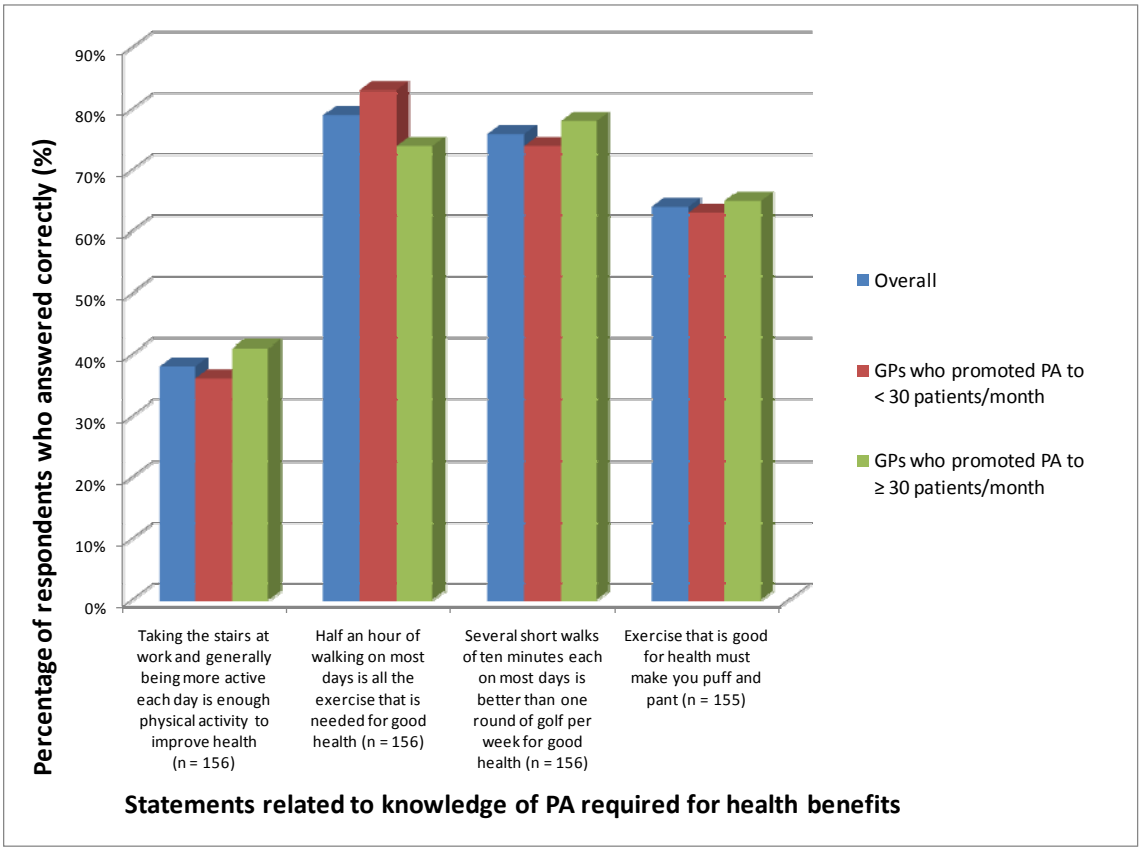

Figure 16: *Percentage of GPs who promoted PA to less than 30 or at least 30 patients/month who answered the knowledge statements correctly*

A Chi-Squared Test for Association indicated that there is a very low correlation between having completed a course or special training related to exercise science or exercise counselling and the frequency of promoting PA (p = 0.045, Cramer's V = 0.161) *(Refer to Tables A8 and A9 in Appendix 6)*. However, only 7% of GPs had completed such a course or training *(Refer to Table 4)*.

3.6. GPs' confidence in promoting physical activity

Figure 17 illustrates the GPs' responses to the two statements related to confidence in promoting PA, while Figure 18 illustrates whether the GPs agreed with these statements overall and divided into two groups depending on whether or not they promoted PA to at least 30 patients in the previous

month. The vast majority of GPs feel confident in giving general advice to patients on a physically active lifestyle, with 93% agreeing or strongly agreeing with the statement (median “agree”). However, the percentage of GPs who feel confident in suggesting specific PA programmes for patients is much lower (60%), although the median is still “agree”. A greater proportion of GPs who promoted PA to at least 30 patients in the previous month feel confident both in giving general advice about PA and suggesting specific PA programmes than GPs who promoted PA to less than 30 patients (96% vs. 91% and 71% vs. 52% respectively). Figure 19 shows the GPs’ overall confidence score based on these two statements, with the median score being two out of a maximum score of two (minimum 0, maximum 2).

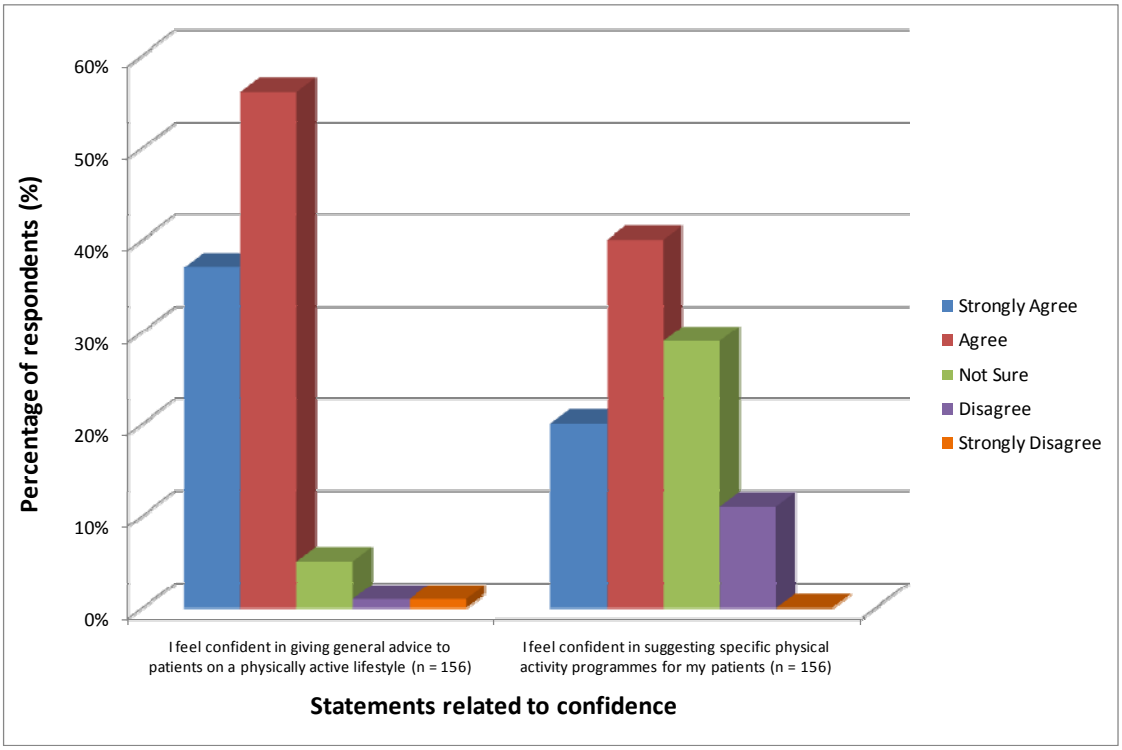

Figure 17: *GPs’ responses to two statements related to confidence in promoting PA*

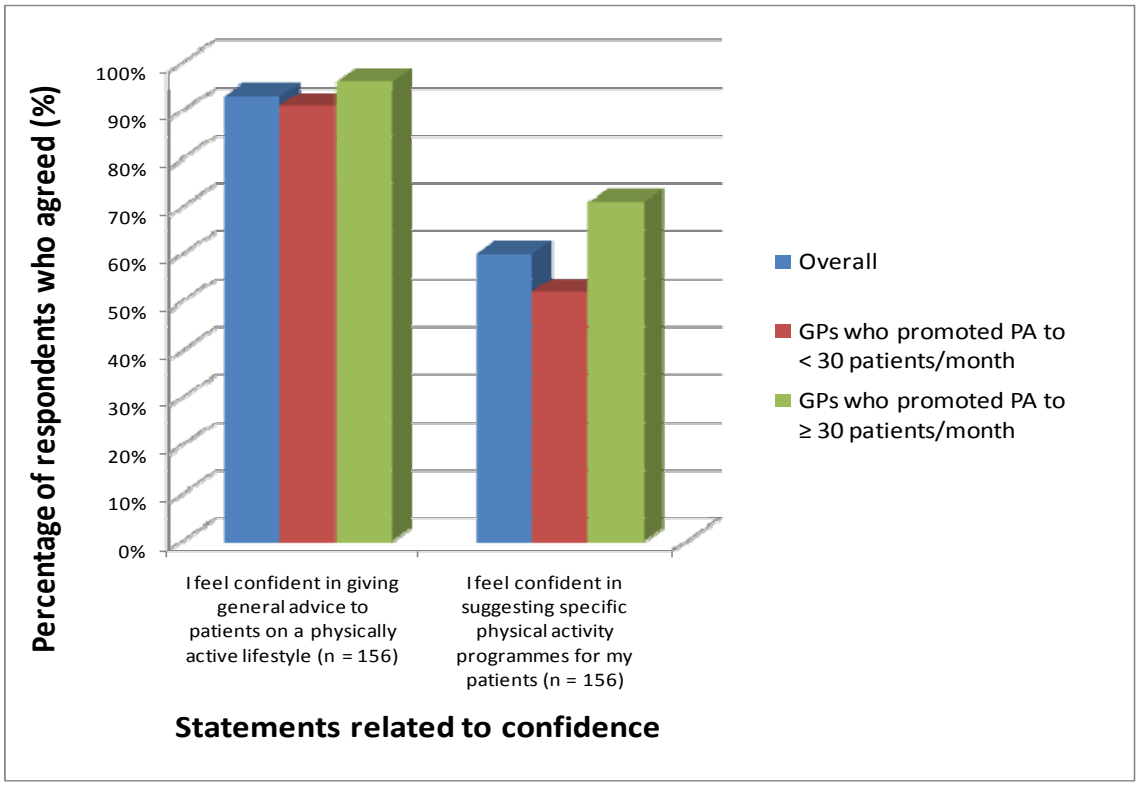

Figure 18: *Percentage of GPs who promoted PA to less than 30 or at least 30 patients/month who agreed with the confidence statements*

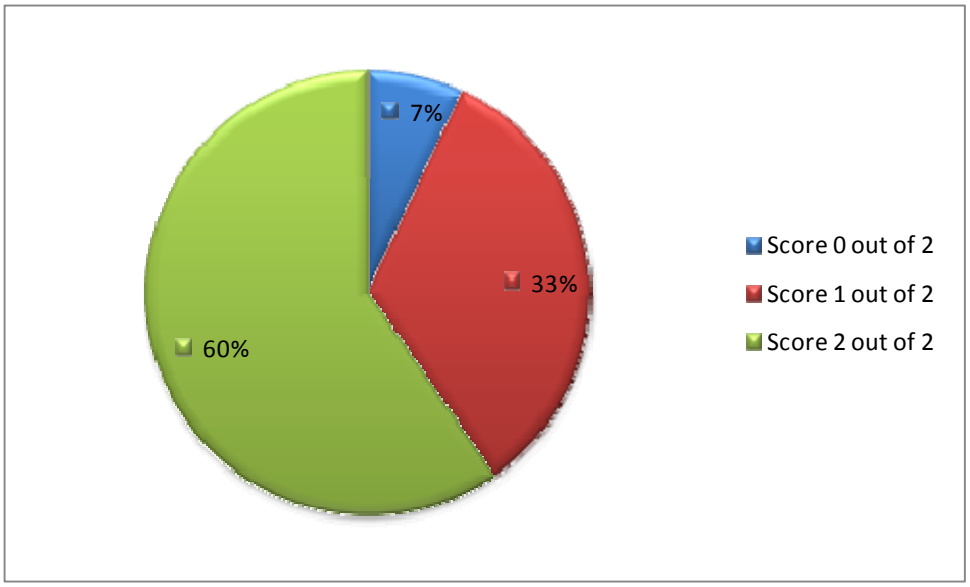

Figure 19: *GPs' confidence score based on two statements to test their confidence (n = 156)*

The Spearman's Rank Correlation Coefficient indicated that there is a significant, but low, correlation between GPs' overall confidence score and the frequency of promoting PA (p = 0.005, r = 0.226) *(Refer to Table A10 in*

Appendix 6). The Spearman's Rank Correlation Coefficient indicated that there is also a significant, low correlation between GPs' confidence in giving general advice to patients about a physically active lifestyle and the frequency of promoting PA (p = 0.0005, r = 0.298) and a significant, low, correlation between GPs' confidence in suggesting specific PA programmes and the frequency of promoting PA (p = 0.0005, r = 0.287) *(Refer to Tables A11-A12 in Appendix 6)*.

3.7. GPs' role perception regarding physical activity promotion

Figure 20 illustrates the GPs' responses to the three statements related to role perception about PA promotion. The vast majority of GPs feel that PA promotion is part of their role, with 97% agreeing or strongly agreeing that discussing the benefits of a physically active lifestyle and suggesting to patients ways to increase daily PA are both part of the GP's role, with the median reply to both statements being "strongly agree". Although the majority still agree or strongly agree, fewer respondents feel that GPs should be physically active to act as a role model for patients (88%; median "agree"). Figure 21 shows the GPs' overall role perception score based on these three statements, with the median score being three out of a maximum score of three (minimum 0, maximum 3).

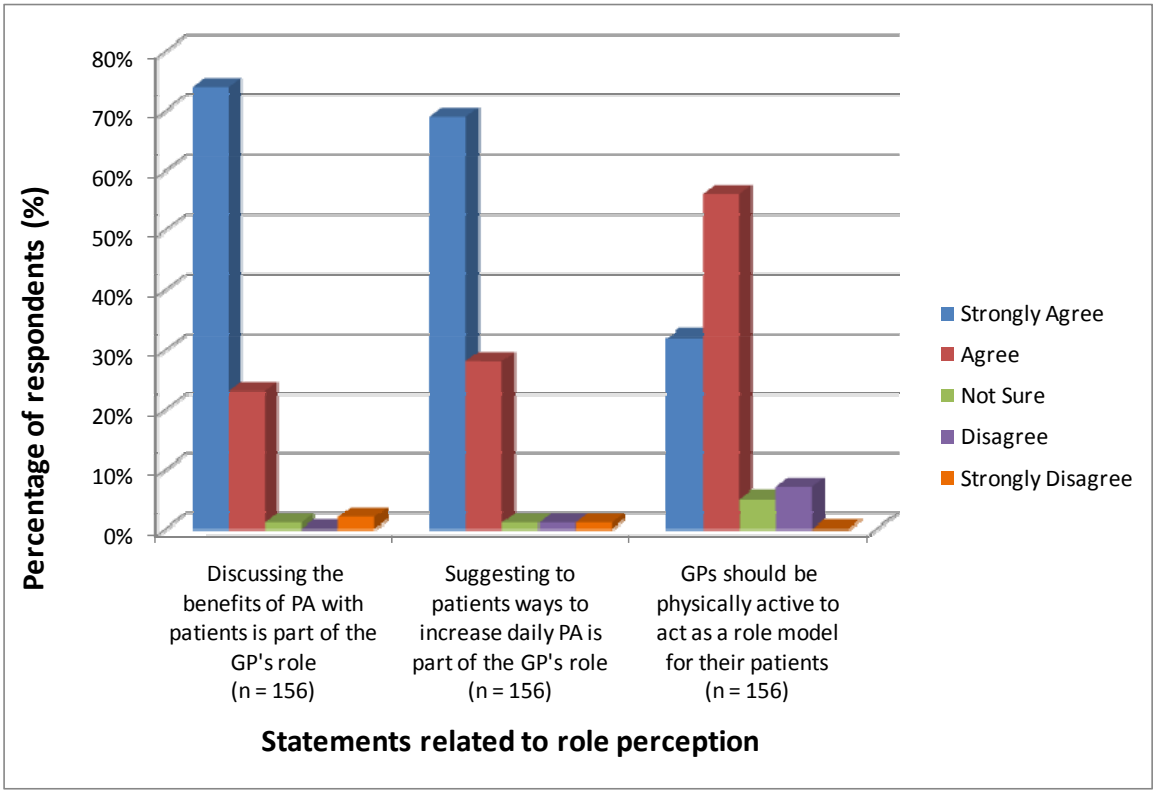

Figure 20: *GPs' responses to three statements related to role perception about PA promotion*

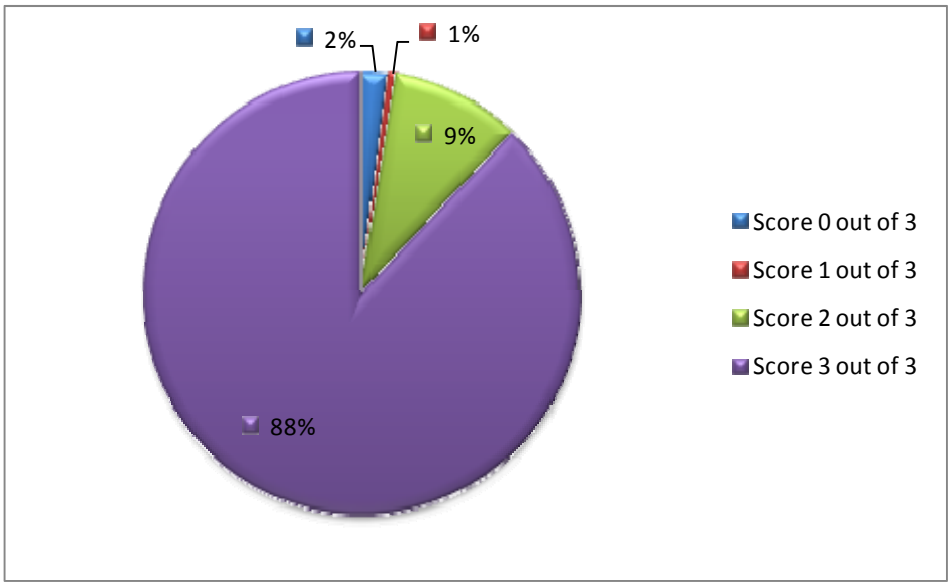

Figure 21: *GPs' role score based on three statements to test role perception (n = 156)*

3.8. GPs' physical activity levels

Figure 22 illustrates how the respondents rated their own PA levels in comparison to other Maltese people of the same sex and age. The majority

of respondents (51%) believe that they are much more or slightly more active, 24% believe that their PA levels are about the same and 25% believe that they are slightly less or much less active than other Maltese people of the same sex and age, with the median reply being “slightly more active”.

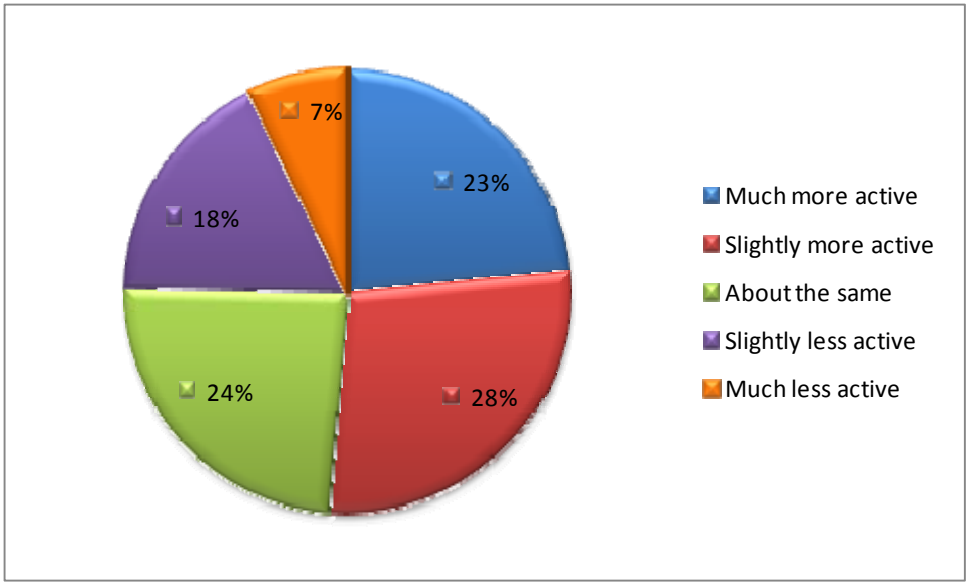

Figure 22: *How GPs think their physical activity levels compare to other Maltese people of the same sex and age (n = 154)*

The Spearman’s Rank Correlation Coefficient indicated that there is a significant, but very low, correlation between GPs’ ratings of their PA levels compared to other Maltese people of the same sex/age and frequency of promoting PA (p = 0.038, r = 0.168) *(Refer to Table A13 in Appendix 6)*. In fact, Figure 23 shows that 61% of GPs who promoted PA to 30 or more patients in the previous month believe that they are much or slightly more active than other Maltese people of the same gender and age, whereas a smaller percentage of GPs who promoted PA to less than 30 patients believe so (43%).

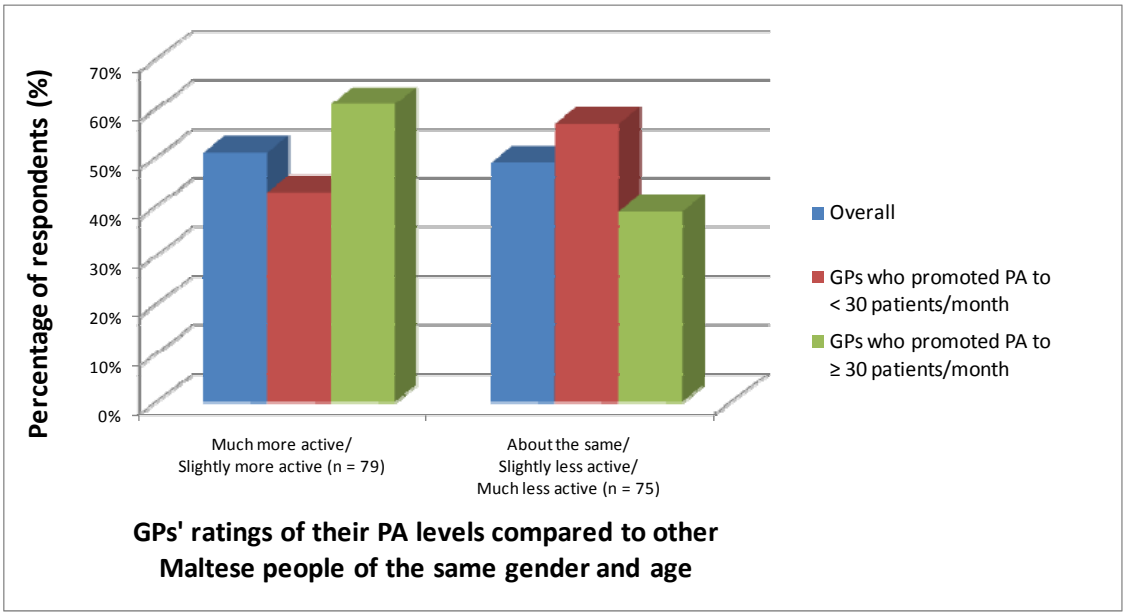

Figure 23: *How GPs who promoted PA to less than 30 or at least 30 patients/month think their PA levels compare to other Maltese people of the same sex and age*

3.9. Barriers to physical activity promotion

Figure 24 shows that the most common barrier reported by the GPs to prevent them from promoting a physically active lifestyle with their patients is a lack of time. Sixty-one per cent of respondents stated that this "sometimes", "often" or "very often" prevents them from doing so, with "sometimes" being the median reply. This was followed by a lack of suitably qualified exercise professionals to refer patients to (50%; median "rarely"), feeling that it would not change the patient's behaviour (37%; median "rarely"), lack of counselling skills (25%; median "rarely"), feeling that it would not be beneficial for the patient (15%; median "never"), a lack of remuneration (10%; median "never") and a lack of interest in promoting PA (6%; median "never"). Ten per cent of respondents also cited other barriers, including co-morbidities, pain and/or disability from chronic illness and factors related to patients' attitudes, such as poor response and lack of motivation.

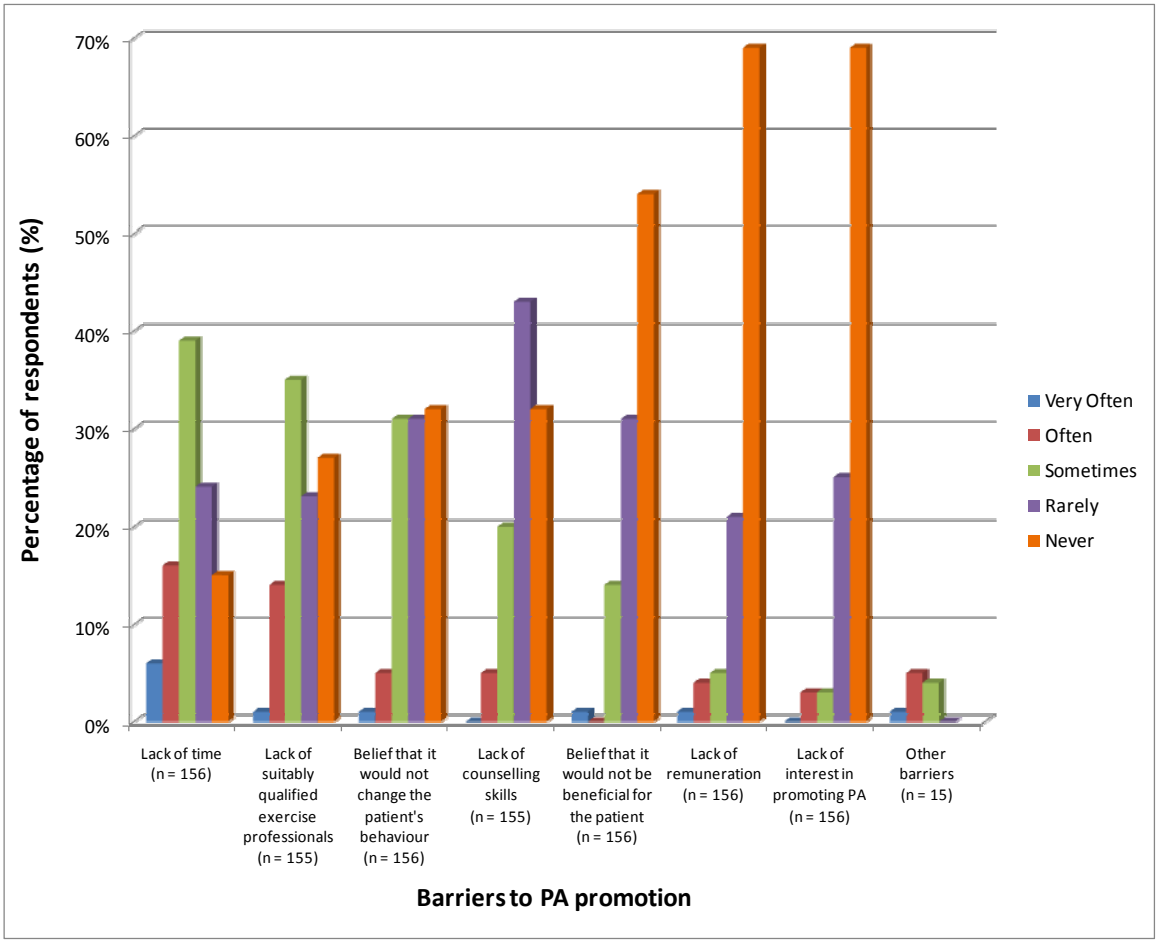

Figure 24: *How often different barriers prevent GPs from promoting a physically active lifestyle with their patients*

3.10. Strategies for implementation of physical activity promotion in general practice

Figure 25 depicts Maltese GPs' opinions about the types of PA promotion which would be feasible for them to deliver to their patients. The GPs identified brief counselling integrated into their regular consultations as the most feasible, with 95% of respondents considering it to be "highly feasible" or "somewhat feasible", and with "highly feasible" being the median reply. This was followed by referral to a suitably qualified exercise professional (79%; median "somewhat feasible"), distribution of resources (such as brochures) (74%; median "somewhat feasible") and separate one-on-one

consultations (48%; median “not sure”). Group sessions are considered the least feasible (13%; median “not really feasible”).

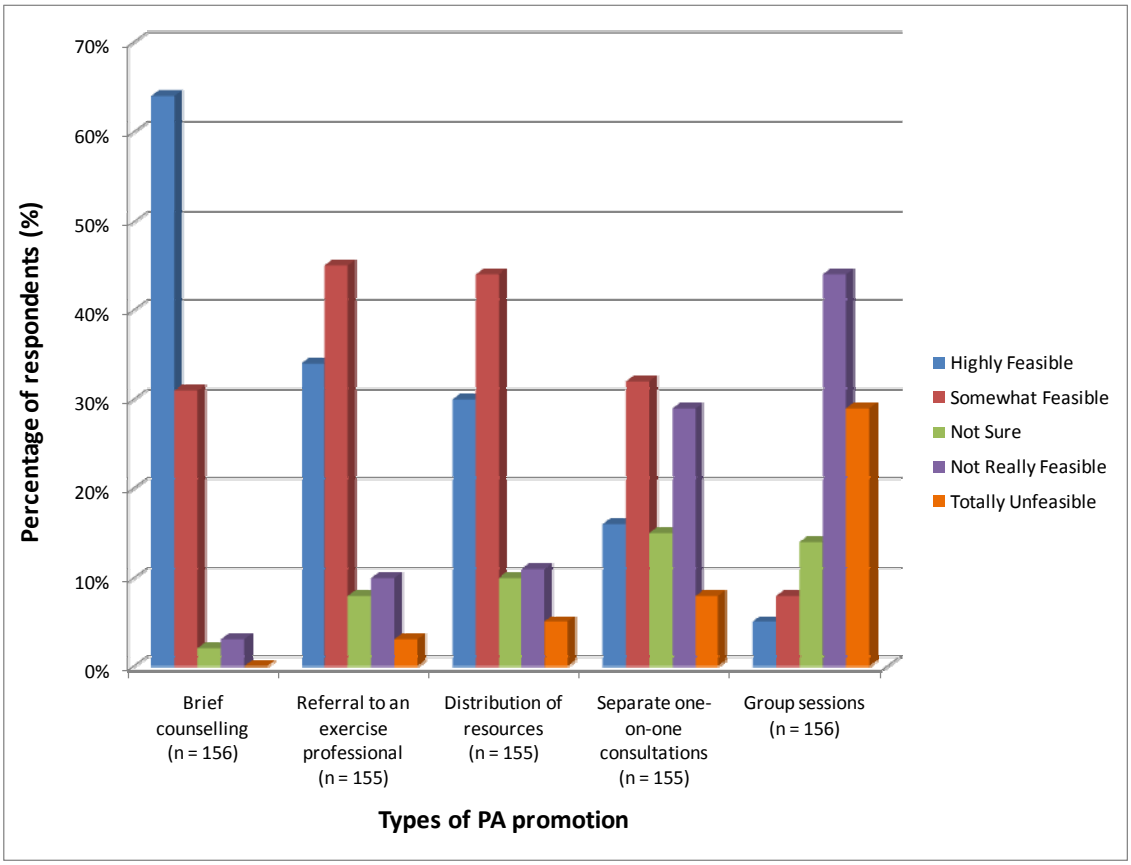

Figure 25: *How feasible GPs consider different types of PA promotion*

Chapter 4: Discussion

4.1. Summary of the primary findings of this study

This study has analysed the beliefs, attitudes and self-reported practices of PA promotion in general practice of 156 Maltese GPs. The main finding is that PA promotion by Maltese GPs is generally low. It was also found that Maltese GPs are more likely to promote PA if they perceive it as relevant to the patient's condition (secondary prevention), rather than routinely with all patients (primary prevention). Notwithstanding this, Maltese GPs' role perception with regards to PA promotion was found to be very high. However, their knowledge of the national PA recommendations was found to be very low, with GPs who know the PA recommendations being somewhat more likely to promote PA with more patients than those who do not. Knowledge of PA required for health benefits, measured by GPs' answers to the knowledge questions, was found to be higher than knowledge of the PA recommendations, but there was no relationship between GPs' answers to the knowledge questions and frequency of promoting PA. Maltese GPs were found to be more confident in giving general advice about PA than in suggesting specific PA programmes, and a relationship was found between Maltese GPs' confidence in promoting PA and frequency of promoting PA. The majority of Maltese GPs believe that they are much more or slightly more active than Maltese people of the same age and gender, and a relationship was also found between Maltese GPs' PA levels and frequency of promoting PA. The most common barrier reported by Maltese GPs to prevent them from promoting PA is a lack of time, while brief counselling integrated into their

regular consultations is considered to be the most feasible type of PA promotion.

4.2. Comparison to reviewed research

Table 5 provides a summary of Maltese GPs' responses and comparison to an Australian (Buffart et al., 2009) and British study (Douglas et al., 2006).

Table 5: *Summary of Maltese GPs' responses and comparison to two reviewed studies*

Outcome	Current study (*n* = 156) Agree, *n* (%)	Australian study* (*n* = 747) Agree, *n* (%)	British study** (*n* = 376) Agree, *n* (%)
Discussing PA with patients PA discussed with ≥30 patients/ month (current study) or ≥10 patients/week (Australian study)	68 (44%)	319 (44%)	
Categories of patients most frequently given PA advice Given PA advice very often (current study) or always (British study):			
1. Diabetic patients	118 (76%)		131 (35%)
2. Overweight patients	117 (75%)		224 (60%)
3. Patients with hypercholesterolemia	114 (73%)		96 (26%)
4. Hypertensive patients	82 (53%)		154 (42%)
5. Patients with known IHD	58 (37%)		137 (37%)
6. Depressed patients	50 (32%)		74 (20%)
7. Sedentary but otherwise healthy patients	39 (25%)		N/A
Knowledge of PA message Aware of PA recommendations	29 (19%)		49 (13%)
Taking the stairs at work and generally being more active each day is enough PA to improve health	60 (39%)	418 (57%)	
Half an hour of walking on most days is all the exercise that is needed for good health	123 (79%)	604 (82%)	
Exercise that is good for health must make you puff and pant	39 (25%)	77 (10%)	
Several short walks of 10 min each on most days is better than one round of golf per week for good health	117 (74%)	586 (79%)	

Outcome	Current study (*n* = 156) Agree, *n* (%)	Australian study* (*n* = 747) Agree, *n* (%)	British study** (*n* = 376) Agree, *n* (%)
Confidence in giving PA advice			
I feel confident in giving general advice to patients about PA	145 (93%)	680 (92%)	
I feel confident in suggesting specific PA programmes	93 (60%)	586 (79%)	
Role of GPs			
Discussing benefits of PA with patients is part of GP's role	152 (97%)	732 (99%)	
Suggesting ways to increase daily PA is part of GP's role	152 (97%)	727 (98%)	
GPs should be physically active to act as a role model	138 (88%)	658 (89%)	
GPs' PA levels			
Much more or slightly more active than other Maltese people of the same sex and age	79 (51%)		
Barriers to PA promotion			
Lack of time prevents GPs from promoting PA sometimes/often/very often	94 (61%)		
Strategies for implementation of PA promotion			
Brief counselling integrated into regular consultations is highly feasible/somewhat feasible	148 (95%)		

*Reference: Buffart et al. (2009) – Comparison to results of 2000 survey, since in 2007 the response rate was lower than in the current study (40%). Response rate in 2000 and in the current study was 53%, making the results more comparable.
**Reference: Douglas et al. (2006)

4.2.1. Level of physical activity promotion

In this study, 44% of Maltese GPs reported encouraging at least 30 patients to lead a more physically active lifestyle in the previous month. The findings are comparable to those of Buffart et al. (2009), who found that 43% of Australian GPs surveyed in 1997 and 44% in 2000 reported discussing PA with at least 10 patients a week. Although 10 patients a week is slightly greater than 30 patients a month, the findings are still comparable since

Maltese GPs reported seeing slightly fewer patients than the Australian GPs (Maltese GPs – 118 ± 79 patients per week, Australian GPs – 135 ± 55 and 130 ± 60 patients per week in 1997 and 2000 respectively). Buffart et al. (2009) found that by 2007 the percentage of GPs who reported discussing PA with at least 10 patients a week increased to 53%, which is slightly higher than in the current study, but this could be due to the decline in response rate in 2007, which might have introduced selection bias *(Refer to Section 1.3.1)*.

One of the limitations of the current study is that GPs were not asked for the percentage of patients whom they encouraged to increase PA, and it was not possible to calculate the maximum theoretical percentage of patients encouraged to increase PA for GPs who encouraged more than 30 patients a month. However, given that the median number of patients seen each month is 433 patients (minimum 52, maximum 1,560), it is reasonable to speculate that this percentage could also be low among a large proportion of the 44% of respondents who encouraged at least 30 patients to increase PA in the previous month. However, without further data to support it, this remains a speculation. Nevertheless, calculation of the maximum theoretical percentage for GPs who encouraged less than 30 patients a month indicated that the majority (52%) of respondents encouraged less than 30% of their patients to increase PA in the previous month. Thus, the null hypothesis is rejected, as PA promotion by Maltese GPs is generally low.

This finding is also comparable to the finding of Walsh et al. (1999) that 57% of American physicians counsel less than 50% of their patients about PA. It is not possible to compare the findings from this study to that of Bull et al. (1995) that only 21% of GPs reported recommending PA to all patients, since

in this study GPs were not asked whether they recommend PA to all their patients. McKenna et al. (1998), Brotons et al. (2005) and Sammut (2006) reported higher levels of PA promotion than in the present study (69%, 56% and 61% of respondents, respectively, reported regularly promoting PA with patients). However, this difference could be due to the fact that, in these studies, GPs were not asked specifically about the numbers/percentages of patients with whom they promote PA, but were asked more generally whether they regularly promote PA. This is thus a more subjective measure, which could explain why lower levels of PA promotion were reported in studies, including the current one, which used more objective measures.

4.2.2. Routine promotion of physical activity versus promotion as secondary prevention

This study found that Maltese GPs report providing PA advice most frequently to diabetic patients, overweight patients, patients with hypercholesterolemia and hypertensive patients. None of the GPs reported never providing PA advice to any category of patients apart from depressed patients (1%). Furthermore, no GPs reported rarely providing PA advice to diabetic or overweight patients. However, the percentage of GPs who reported rarely providing PA advice to sedentary but otherwise healthy patients was 8% (1% for patients with hypercholesterolemia, 2% for hypertensive patients, 4% for patients with known IHD and 9% for depressed patients). It is thus clear that Maltese GPs are more likely to promote PA if they perceive it as relevant to the patient's condition (particularly in the case of diabetic patients, overweight patients and patients with hypercholesterolemia), rather than routinely with all patients. Therefore, the

null hypothesis is rejected. Maltese GPs are more likely to promote PA as secondary, rather than primary, prevention.

Since, in the current study, GPs reported most frequently providing PA advice to diabetic patients, followed by overweight patients, the results are in line with the findings from studies by patient report, that 73% of adults with diabetes received PA advice from a health professional, as opposed to 31% of adults without diabetes (Morrato et al., 2006) and that patients who were overweight to obese (BMI 25 to ≥ 30 $kg \cdot m^{-2}$) were more likely to be counselled than those with BMI higher than 25 $kg \cdot m^{-2}$, as were diabetic patients ($p < 0.001$) (Wee et al., 1999).

The results from the current study also support the findings of previous studies by GP self-report. In one such study, 47% of GPs agreed that they only advise patients about PA if linked to their presenting problem (Douglas et al., 2006). While in the current study 92% of GPs reported very often, often or sometimes recommending PA to sedentary but healthy patients, Lawlor et al. (1999) reported the frequency of PA promotion opportunistically in all patients to be much lower than in the current study (38% always/sometimes, 62% occasionally/never). Although the categories in the study by Lawlor et al. (1999) were slightly different from those in the current study, the fact that no GPs in the current study and 22% of GPs in the study by Lawlor et al. (1999) reported never promoting PA opportunistically clearly indicates a difference between the two studies.

It is questionable whether this high frequency of promoting PA to sedentary but healthy patients reported by Maltese GPs, in contrast to the much lower

frequency reported by Lawlor et al. (1999), is realistic, given that overall PA promotion by Maltese GPs was found to be low *(Refer to Section 4.2.1)*. Therefore, it seems possible that GPs' responses to this question were based more on social desirability than on reality. This could have been a greater factor in the current study than in the study by Lawlor et al. (1999), which is more than a decade old, when the importance of PA promotion was not as greatly recognised and thus GPs might have been less likely to exaggerate their responses due to social desirability.

In the current study, GPs reported most frequently providing PA advice to diabetic patients (76% very often, 99% very often/often). This was much higher than in the studies by Lawlor et al. (1999) (33% always) and Douglas et al. (2006) (35% always, 80% always/often). Although the use of the category "very often" as opposed to "always" in the current study could have resulted in differences, this does not seem likely, since in the case of overweight patients, the frequency of PA promotion reported by GPs was practically identical in all three studies, as well as in the study by Bull et al. (1995) (current study – 75% very often, 97% often/very often; Bull et al. (1995) – 97% often/almost always; Lawlor et al. (1999) – 77% always and Douglas et al. (2006) – 60% always, 97% always/often). However, whereas in the current study GPs reported most frequently providing PA advice to diabetic patients, Lawlor et al. (1999), Douglas et al. (2006) and Bull et al. (1995) found that GPs would give PA advice most frequently to patients who were overweight. The higher emphasis on promoting PA with diabetic patients among Maltese GPs could be due to the fact that the incidence rate of type 2 diabetes in Malta is much higher than in Australia and the UK, and consequently there is also high awareness in Malta about diabetes and the

importance of PA for diabetic individuals. The prevalence estimate of diabetes among adults aged 20-79 years is 6.8% in Malta, as opposed to 3.6% in the UK (OECD, 2010), whereas in Australia, 3.8% of the population have type 2 diabetes (Australian Institute of Health and Welfare, 2011)

In the current study, the frequency of giving PA advice always/very often was also similar to the studies by Lawlor et al. (1999) and Douglas et al. (2006) for hypertensive patients (53% very often, 47% always and 42% always in the three studies respectively) and patients with known IHD (37%, 41% and 37%). Whereas Lawlor et al. (1999) did not report the frequency of providing PA advice to patients with hypercholesterolemia, the proportion of Maltese GPs who reported providing such advice very often (73%) was much higher than in the study by Douglas et al. (2006) (26%), which could also possibly be due to higher prevalence levels in Malta, although such statistics are not available for comparison purposes.

It can be concluded that although there are some differences in the categories of patients given the most importance for PA promotion by GPs in the current study and in previous studies, it is clear that PA promotion occurs mainly if PA is relevant to a patient's presenting condition (secondary prevention), rather than routinely with all patients (primary prevention).

4.2.3. GPs' knowledge of the physical activity recommendations

This study found that only 19% of Maltese GPs know the PA recommendations (either the Maltese or UK guidelines). These findings are similar to those of Douglas et al. (2006) and Walsh et al. (1999), with a

slightly greater proportion of Maltese GPs aware of the recommendations than the 13% of Scottish GPs and 12% of US GPs in these two studies respectively. On the other hand, Williford et al. (1992) found slightly higher levels of knowledge of the PA recommendations in the USA than in the current study, since 23% of GPs knew the ACSM guidelines. This higher level of knowledge of the guidelines was recorded before the new exercise guidelines in the mid-1990s started emphasising regular, moderate PA for health benefits rather than structured, vigorous exercise *(Refer to Section 1.1)*, which could be the cause of the difference in knowledge levels reported, since unfortunately it appears that some GPs are still unfamiliar with the newer guidelines and instead record the older ones when asked. In fact, Douglas et al. (2006) found that 18% of GPs recorded the previous recommendations (20 minutes PA three times a week). In the current study, it was also found that 6% of GPs recorded the older PA recommendations.

Initiatives to increase Maltese GPs' knowledge of current PA recommendations are thus very important, particularly since it was found that Maltese GPs who know the PA recommendations are somewhat more likely to encourage PA to 30 or more patients in a month than those who do not know the recommendations (59% vs. 41%, $p = 0.082$). This was very similar to the finding of Walsh et al. (1999) that physicians who were familiar with the ACSM recommendations were somewhat more likely to engage in regular exercise counselling (62% vs. 40%, $p = 0.06$). However, as in the study by Walsh et al. (1999), this did not achieve significance in the current study and thus the null hypothesis is accepted. There is no relationship between Maltese GPs' knowledge of the PA recommendations and their PA promotion

practices. It is, however, possible that this relationship might have reached significance with a larger sample.

4.2.4. GPs' knowledge of physical activity required for health benefits

Although Maltese GPs' knowledge of the PA recommendations was very low, their median overall knowledge score as measured by their responses to the four statements related to knowledge of PA required for health benefits was three out of a maximum score of four. It is not clear why the majority of GPs in this study could not cite the PA recommendations, but scored well on the knowledge questions, which were in fact related to aspects of the recommendations. However, the GPs who do know the recommendations only scored better than GPs who do not know the recommendations in two out of the four questions (the question regarding half an hour of walking on most days being all the exercise that is needed for good health and that several short 10 minute walks each day are better for health than one longer exercise session per week). In the questions regarding whether vigorous exercise is required for health and whether generally being more active each day improves health, the GPs who do not know the PA recommendations scored better than the ones who do. Therefore, GPs' answers to the knowledge questions do not appear to reflect their knowledge of the PA recommendations, which could mean that although they cannot cite the PA recommendations, they are at least familiar with certain aspects of its content.

Overall, 39% of Maltese GPs correctly agreed that taking the stairs and generally being more active each day is beneficial for health, which is a

slightly greater proportion of respondents than Australian GPs who agreed in 1997 (30%), but a smaller proportion than those who agreed in 2000 (57%) and 2007 (52%) (Buffart et al., 2009). Similar to the proportion of Australian GPs who agreed in 2000 (79%) and 2007 (79%), 74% of Maltese GPs correctly agreed that 10 minute bouts of walking on most days are better than just one longer session per week. Whereas in 2007 fewer Australian GPs (68%) agreed that half an hour of walking on most days is all the exercise that is needed for good health, 79% of Maltese GPs in this study correctly agreed with this statement, which is only a slightly lower percentage than the 82% of Australian GPs who agreed in 2000. However, the percentage of Maltese GPs in this study who incorrectly agreed that vigorous activity is necessary for health benefits (25%), was the same as the percentage of Australian GPs in 2007 (25%), which was substantially higher than the percentage of Australian GPs who agreed in 2000 (10%).

Buffart et al. (2009) hypothesised that this shift towards greater emphasis on vigorous-intensity exercise in Australia in 2007 was due to the rise in prevalence of obesity in the Australian population and its increased media attention, with higher intensities or longer durations of PA than the minimum recommended 30 minutes/day of moderate PA on five days/week being recommended to prevent or reduce overweight or obesity. This could thus also be the case in Malta, where obesity rates are very high (22.3%) (OECD, 2010). On the other hand, while it is positive that the majority of Maltese GPs agree that 10 minute bouts of walking on most days are better than just one longer session per week and that half an hour of walking on most days is all the exercise that is needed for good health, it is discouraging that only 39% of Maltese GPs agreed that taking the stairs and generally being more active

each day is beneficial for health. However, it is possible that the wording of the statement: “Taking the stairs at work and generally being more active each day is enough physical activity to improve health” was misleading, since the use of the word “enough” might have led Maltese GPs to believe that the statement means that taking the stairs at work and generally being more active each day is the optimum amount of PA for health improvements and that no more PA than that is required, rather than that it is enough PA to lead to *some* health improvements. Thus, had the statement been worded differently, particularly without the use of the word “enough”, more Maltese GPs might have agreed with it. The proportion of Australian GPs who agreed with this statement was also very low in 1997 (slightly higher in 2000 and 2007) (Buffart et al., 2009), indicating that a similar misunderstanding could have occurred in Australia.

In fact, using a different questionnaire, Lawlor et al. (1999) found that 73% of English GPs agreed that any amount of PA is beneficial to health. Rather than necessarily indicating higher levels of knowledge among English GPs, this could simply mean that the wording in this questionnaire was clearer than in the current study and the Australian one. However, Lawlor et al. (1999) also found that a lower percentage of GPs (8%) than in the current study believed that only vigorous/strenuous activity is beneficial to health, which was similar to the 10% of Australian GPs who believed so in 2000, indicating that there is clearly room for improvement in Maltese GPs’ knowledge levels.

In the current study, while a slightly greater proportion of GPs who promoted exercise to at least 30 patients in the previous month answered three out of

the four knowledge questions correctly (a smaller proportion in the case of the statement about half an hour of exercise on most days being all the exercise required for good health), no relationship was found between GPs' overall knowledge score or GPs' responses to any of the knowledge questions and their frequency of promoting PA. Therefore, the null hypothesis is accepted as there is no relationship between Maltese GPs' knowledge of PA required for health benefits and their PA promotion practices.

This is contrary to the findings of Walsh et al. (1999) that physicians who felt that they had adequate knowledge to prescribe exercise to healthy adults were more likely to ask about (72% vs. 49%, $p = 0.004$) and counsel about (48% vs 29%, $p = 0.03$) exercise. It is possible that this difference is due to the fact that, contrary to the current study, in the study by Walsh et al. (1999), this relationship was based on perceived, rather than actual, exercise knowledge.

On the other hand, in the current study, there was a significant, but very low correlation, between having ever completed a course or special training related to exercise science or exercise counselling and the frequency of promoting PA ($p = 0.045$, Cramer's V = 0.161). Similarly, Australian GPs who reported attending CPD on PA in the previous 12 months in 2007 were 2.17 (95% CI 1.54 to 3.04) times more likely to discuss PA with ≥ 10 patients per week than those who did not ($p < 0.001$) (Buffart et al., 2009). However, whereas 43% of Australian GPs had attended CPD on PA in the previous 12 months, only 7% of Maltese GPs had ever completed a course/training related to exercise science/exercise counselling. Therefore, providing

Maltese GPs with appropriate CPD opportunities on PA and health and encouraging them to attend could be one way of increasing their knowledge of PA.

While such initiatives to increase Maltese GPs' knowledge are important, no increases were reported in the number of patients with whom Australian GPs discussed PA although their knowledge about PA required for health benefits increased between 1997 and 2000 following various initiatives (van der Ploeg et al., 2007). This indicates that future research is required to identify other effective strategies to increase Maltese GPs' PA promotion behaviour.

4.2.5. GPs' confidence in promoting physical activity

In this study, 93% of GPs agreed that they feel confident in giving general advice to patients on a physically active lifestyle. The percentage of GPs who feel confident in suggesting specific PA programmes is lower (60%). However, this results in high overall confidence levels, with the median confidence score based on these two statements being two out of a maximum score of two. These results are similar to those of Bull et al. (1997), who found that a similar percentage of Australian GPs felt confident about providing general advice on PA (91%), although a lower percentage of GPs felt confident about providing specific advice on PA (46%). The results of the current study were also similar to those of Buffart et al. (2009), who also found that a greater percentage of GPs were confident in giving general advice on PA (82% in 1997, 92% in 2000 and 2007) than in suggesting specific PA programmes (61% in 1997, 79% in 2000 and 69% in 2007).

In the current study, confidence levels were higher among GPs who promoted PA to at least 30 patients in the previous month than GPs who promoted PA to less than 30 patients, both in giving general advice (96% vs. 91%) and suggesting specific PA programmes (71% vs. 52%). In fact, a significant, but low, correlation was found between GPs' overall confidence score and frequency of promoting PA (p = 0.005, r = 0.226) and between GPs' confidence in giving general advice to patients about PA and their PA promotion practices (p = 0.0005, r = 0.298) and GPs' confidence in suggesting specific PA programmes and their PA promotion practices (p = 0.0005, r = 0.287). Consequently, the null hypothesis is rejected since there is a relationship between Maltese GPs' confidence in promoting PA and their PA promotion practices.

This is similar to the findings of Walsh et al. (1999) that U.S. physicians who felt confident that they were successful in changing behaviour were more likely to ask about (p = 0.001) and counsel about (p = 0.05) exercise and of Saliba (2009) that Maltese GPs' confidence in counselling was associated with reported rate of health behaviour counselling (p = 0.001). Following the finding of McAvoy et al. (1999) that only 29% of GPs feel effective or very effective at helping patients to exercise regularly, but 60% believe that they would feel this way if provided with adequate information and training, it is possible that higher levels of confidence could be instilled through appropriate training. However, as with their knowledge levels and role perception, although Australian GPs' confidence levels increased between 1997 and 2000, the frequency of PA promotion did not appear to increase (van der Ploeg et al., 2007).

4.2.6. GPs' role perception regarding physical activity promotion

In this study, the median score for overall role perception was three out of a maximum score of three, indicating that Maltese GPs' role perception regarding PA promotion is very high. This is in line with the findings of Lawlor et al. (1999) that the vast majority of British GPs (97%) agreed that promoting PA is important in primary care. Buffart et al. (2009) also found very high levels of role perception regarding PA promotion among Australian GPs, with the Maltese GPs' answers to the role perception statements being very similar to the Australian ones. In both this study and the Australian one, more than 90% of GPs agreed that discussing the benefits of PA with patients is part of the GP's role (Maltese GPs – 97%; Australian GPs – 92% in 1997, 99% in 2000 and 98% in 2007) and that suggesting to patients ways to increase daily PA is part of the GP's role (Maltese GPs – 97%; Australian GPs – 91% in 1997, 98% in 2000 and 98% in 2007). Slightly fewer, but still the majority, agreed that GPs should be physically active to act as a role model for their patients (Maltese GPs – 88%; Australian GPs – 76% in 1997, 89% in 2000, 92% in 2007). As with their knowledge and confidence levels, although Australian GPs' role perception increased between 1997 and 2000, the frequency of PA promotion did not increase (van der Ploeg et al., 2007).

Contrary to the current study, only 30% of British GPs agreed that identification of physical inactivity is a very important part of their day-to-day work, in contrast to 81% and 90% who agreed that identification of hypertension and cigarette smoking, respectively, are very important parts of their work (Steptoe et al., 1999). This difference could possibly be due to the fact that, in the latter study, GPs were not asked about physical inactivity

alone, but were asked about it along with other risk factors (such as hypertension and smoking). Therefore, it is possible that while GPs do consider PA promotion to be part of their role as suggested in the majority of studies, they still do not give physical inactivity as much importance as other risk factors and as much importance as it deserves. This could to an extent explain the large gap between GPs' high role perception regarding PA promotion and the PA promotion levels reported in most studies, including the current one.

4.2.7. GPs' physical activity levels

In this study, 51% of GPs reported that they believe they are much more or slightly more active than other Maltese people of the same sex and age, while 24% believe that their PA levels are about the same and 25% believe they are slightly less or much less active than other Maltese people of the same sex and age (median reply "slightly more active"). While the responses to such a question have been shown to determine relative proportions of active and inactive people reliably (Shirley et al., 2010), it is not possible to determine the proportion of Maltese GPs who are regularly active from such responses. Since the other question asking GPs for approximately how long they are physically active each week was not used in the data analysis as it was concluded that it had not been worded correctly *(Refer to Section 2.2)*, it was not possible to make any conclusions about Maltese GPs' PA levels. Had it been possible, it would have been interesting to compare such results to the finding of Sammut (2006) that only 37% of Maltese GPs reported exercising regularly.

However, it was still possible to establish whether or not there was a relationship between Maltese GPs' PA levels and their PA promotion practices. While 43% of GPs who promoted PA to less than 30 patients in the previous month believe that they are much more or slightly more active than other Maltese people of the same age and gender, a greater proportion (61%) of GPs who promoted PA to at least 30 patients believe so. In fact, a significant, but very low, correlation, was found between GPs' PA levels and frequency of promoting PA (p = 0.038, r = 0.168). Therefore the null hypothesis is rejected, as there is a relationship between Maltese GPs' PA levels and their PA promotion practices.

This finding supports the suggestion of Lobelo et al. (2009) that physically inactive doctors are less likely to provide exercise counselling to patients. It is also in line with the findings of McKenna et al. (1998) that GPs were more likely to promote exercise if they themselves were regular exercisers (Odds Ratio [OR] = 3.19, 95% confidence intervals [CI] 1.96 to 5.18), of Walsh et al. (1999) that having a pulse rate <65 (more common in physicians who reported exercising regularly, p < 0.001) was associated with counselling >50% of patients about PA (51% versus 36%, p = 0.05) and of Frank et al. (2003) that physicians who reported exercising enough to meet the ACSM recommendations were more likely to counsel patients on exercise (p = 0.004). It is also comparable to the findings of Brotons et al. (2005) that GPs who exercised regularly reported advising sedentary patients to perform regular PA more often than sedentary GPs (p = 0.045 and p = 0.034 in the two hypothetical scenarios).

The findings of this study were thus contrary to those of Steptoe et al. (1999) that personal exercise habits were uncorrelated with attitudes to health promotion generally and to lifestyle counselling for modification of PA in particular ($p > 0.05$). However, this difference could be due to the fact that Steptoe et al. (1999) did not specify what measures they used to classify different personal exercise habits, which could explain why no correlation was found in this study, in contrast to the current study and the majority of the literature. Furthermore, the fact that the sample size (107 GPs) was somewhat smaller than that of the current study (156 GPs) and similar studies could be another reason for this difference.

4.2.8. Barriers to physical activity promotion

The most common barrier reported by GPs to prevent them from promoting PA with their patients in this study was a lack of time (61% “sometimes”, “often”, or “very often”). This was also the most common barrier in the eight studies reviewed by Eakin et al. (2005), identified by 41-93% of respondents in all eight studies. Similarly, in a previous study of Maltese GPs, the main barrier to implementing general health promotion and preventive activities (including PA promotion) was a lack of time and heavy workload (56%) (Sammut, 2006).

In this study, lack of time was followed by a lack of suitably qualified exercise professionals to refer patients to (50%). This option was not included in the studies reviewed by Eakin et al. (2005). However, the next most important barrier in this study, feeling that it would not change the patient’s behaviour, which was identified by 37% of respondents as a barrier, is similar to the second most common barrier in the studies reviewed by Eakin et al. (2005).

This was a perceived lack of patient interest or willingness to adhere to PA advice, with 7 to 55% of respondents in seven studies identifying it as a barrier. However, this study differed from the studies reviewed by Eakin et al. (2005) in that a lack of counselling skills (25%) was seen as a more significant barrier than a lack of remuneration (10%). On the other hand, Eakin et al. (2005) reported that a lack of reimbursement or financial incentive was identified as a barrier by 12-47% of respondents in six of the studies, whereas a lack of counselling skills was identified by 12-65% of respondents in only five studies. In line with this study, 24% of Maltese GPs in the study by Sammut (2006) identified a lack of counselling skills as a barrier to implementing health promotion and preventive activities, but a substantially larger number than in the current study (22%) identified no reimbursement as a barrier.

Therefore, while there are some subtle differences, it appears that the barriers identified by Maltese GPs to prevent them from promoting a physically active lifestyle with their patients are in the large part similar to those which have been identified by GPs in previous studies.

4.2.9. Strategies for implementation of physical activity promotion in general practice

This study found that Maltese GPs consider brief counselling integrated into their regular consultations to be the most feasible type of PA promotion (95% “highly feasible” or “somewhat feasible”), followed by referral to a suitably qualified exercise professional (79%) and distribution of resources, such as brochures (74%). The support for referral to exercise professionals was similar in the USA, with 71% of physicians stating that they would refer

patients to an exercise specialist if available (Walsh et al., 1999). The fact that the majority of Maltese GPs consider brief counselling integrated into their consultations and referral to exercise professionals to be suitable fits in very well with the proposal of Tulloch et al. (2006) and Taylor (2003), who proposed an interdisciplinary model in which GPs use their credibility and existing relationship with patients to recommend PA behaviour change and offer referrals to a PA counsellor for specialised treatment. Apart from having specialised knowledge and being trained in counselling strategies, such professionals also have more time available for more intensive and effective counselling and for the development of a tailored exercise programme (Tulloch et al., 2006; Taylor, 2003). Given that a substantial proportion of Maltese GPs in this study reported that lack of time (61%) and lack of counselling skills (25%) sometimes, often or very often prevent them from promoting PA, such a model involving brief recommendations by GPs and referrals to a PA counsellor could thus be ideal.

However, while it is positive that there is hypothetical support from GPs for such a model, the fact that there is as yet no such framework for referrals in Malta means that further research is required about how such a system could be implemented in practice. The hypothetical support of Australian GPs (47%) (Bull et al. 1997) is considerably lower than that of Maltese GPs (79%). Since an exercise referral framework does exist in Australia but does not as yet in Malta, the difference in hypothetical support between Maltese and Australian GPs could unfortunately mean that the framework in Australia has not been as popular among GPs as one would hope. It is therefore crucial that if such a framework is introduced in Malta, it is done following proper research and based on examples of best practice in other countries.

The fact that Maltese GPs also identified distribution of resources as a feasible strategy means that the proposal of Swinburn et al. (1997) for the development of appropriate resource materials to support successful PA counselling by GPs could also assist in increasing the levels of PA promotion by Maltese GPs. It is important that PA promotion, ideally based on brief counselling in GPs' consultations, distribution of resources and referral to exercise professionals, is also part of a community-wide message at various levels, as proposed by Harris and Smith (2003).

4.3. Limitations of this study

One of the limitations of this study is that selection bias could have influenced the results achieved, since GPs who are interested in PA may have been more likely to participate in the study. The consequence is that the actual levels of GP knowledge, confidence, role perception and practices in relation to PA may be lower than those found in this study. In order to reduce this possibility, efforts were made to maximise the response rate *(Refer to Section 2.3)* and a reasonable response rate was achieved (53%). Furthermore, the gender ratio of non-responders was compared to that of the GPs who responded to give a slight indication of how representative the sample was, and the incidence of males versus females among responders was not significantly higher than that among non-responders.

The self-report measures used in this study are another concern, since it has been found that lower levels of PA promotion are reported by patient surveys than by GP self-report *(Refer to Section 1.3.1).* Particularly due to the increasing media attention to physical inactivity and obesity, GPs may have given what they considered to be more socially desirable responses,

meaning that their PA promotion practices may be lower than reported in this study.

In order to be able to make more definitive conclusions about the level of PA promotion among Maltese GPs, it would have been better to ask them about the percentage of patients with whom they promote PA, rather than asking them how many patients they encouraged to increase PA in the previous month, as was done in the studies by van der Ploeg et al. (2007) and Buffart et al. (2009). The way the question was asked meant that no conclusions could be made about the percentage of patients encouraged to increase PA by GPs who promoted PA to at least 30 patients a month. However, on the other hand, the fact that the GPs were asked for a number rather than a percentage and since the numbers in the answer options were relatively low, it is possible that more truthful answers were obtained from the GPs. Asking for percentages could have led to an increased likelihood of responses based on social desirability. As an example, for 90% of the 59 GPs who stated that they encouraged “20-29 patients” to increase PA in the previous month, this equated to less than 20% of the average number of patients they see in a month. However, the fact that “20-29 patients” was the fourth highest option out of five would make it seem more socially desirable than “less than 20%” and would thus increase the likelihood of the GPs selecting the response truthfully rather than based on social desirability.

The wording of the statement “Taking the stairs at work and generally being more active each day is enough PA to improve health”, which was used to test GPs’ knowledge that any amount of PA is beneficial to health, was misleading due to the use of the word “enough”. Therefore, although only a

small proportion of Maltese GPs agreed with the statement, no conclusions can be made about their knowledge levels in this regard, since incorrect answers could merely indicate misunderstanding of the statement due to the unclear wording.

It would have been interesting to know what percentage of Maltese GPs meet the PA guidelines themselves and to compare the results to findings in previous studies. However, the question asking them for how long they are physically active each week was worded incorrectly and thus no conclusions could be made about their PA levels.

4.4. Recommendations for future research

This study has provided an overview of Maltese GPs' beliefs, attitudes and practices of PA promotion. Since the study was based on self-report by GPs, more objective evidence (such as chart audits or a patient survey about PA promotion in Malta) would be useful to analyse what GPs actually do, rather than what they think they do.

Apart from initiatives to increase Maltese GPs' knowledge and confidence levels, such as through appropriate CPD opportunities on PA and health, future research should be undertaken to identify other effective strategies to increase PA promotion in general practice, since it has been shown that increased knowledge and confidence do not necessarily translate into increased PA promotion (van der Ploeg et al., 2007).

There is hypothetical support among the majority of Maltese GPs for referral to exercise professionals, but since an exercise referral framework does not

currently exist in Malta, it would be very useful to conduct future research about how such a framework could be implemented based on examples of best practice in other countries. Such research is particularly important since the introduction of this type of framework could help to reduce two of the barriers to PA promotion identified by Maltese GPs: lack of time and lack of counselling skills.

Following the present study, future researchers could also conduct a follow-up study to monitor the trends in Maltese GPs' knowledge, confidence, role perceptions and practices related to PA promotion and to examine the extent that future initiatives to increase attention to this issue in general practice result in changes.

4.5. Conclusion

This study has found that PA promotion by Maltese GPs is generally low and that they are more likely to promote PA if they perceive it as relevant to the patient's condition (secondary prevention), rather than routinely with all patients (primary prevention). Due to the general consensus that PA promotion by GPs could have a significant public health impact, identifying strategies to increase the level of PA promotion not merely as secondary prevention, but also as routine practice, is crucial. This is particularly important since the levels of physical inactivity and obesity are very high in Malta. The potential impact of PA promotion by Maltese GPs can be further highlighted through the fact that a large proportion of the population visit a GP each year and that GPs are seen as a credible source of health information.

Although Maltese GPs' knowledge as measured by their answers to the questions related to knowledge of PA required for health benefits was found to be reasonable, their knowledge of the national PA recommendations was found to be extremely low. Initiatives to increase Maltese GPs' knowledge of the current PA recommendations are very important, particularly since GPs who know the PA recommendations are somewhat more likely to promote PA with more patients than those who do not. Providing Maltese GPs with appropriate CPD opportunities on PA and health and encouraging them to attend could be one way of increasing their knowledge of PA.

Maltese GPs were found to be more confident in giving general advice about PA than in suggesting specific PA programmes, and a relationship was found between Maltese GPs' confidence in promoting PA and their PA promotion practices. This confirms the importance of providing GPs with adequate information and training opportunities.

The majority of Maltese GPs believe that they are much more or slightly more active than Maltese people of the same age and gender. While no conclusions could be made about their actual PA levels from this study, a previous study has found that only 37% of Maltese GPs reported exercising regularly (Sammut, 2006). Since a relationship was found between Maltese GPs' PA levels and their PA promotion practices in the current study, initiatives to increase the PA levels of GPs themselves could also be useful.

Maltese GPs consider brief counselling integrated into their regular consultations as the most feasible type of PA promotion. Since there is also hypothetical support among the majority of Maltese GPs for referral to

exercise professionals, the interdisciplinary model proposed by Tulloch et al. (2006) and Taylor (2003), in which GPs use their credibility and existing relationship with patients to recommend PA behaviour change and offer referrals to a PA counsellor for specialised treatment, could thus be ideal. Such a model would also reduce the problems of lack of time and lack of counselling skills, identified by a significant proportion of Maltese GPs to prevent them from promoting PA. However, further research is required about how such a framework could be implemented. The fact that Maltese GPs' role perception related to PA promotion was found to be high could be viewed as a positive sign that such strategies to introduce new methods of PA promotion could be successful.

In conclusion, this study has found that PA promotion by Maltese GPs – particularly routine promotion – is low, as is GPs' knowledge of the PA recommendations. Strategies are thus required to increase knowledge levels about PA and PA promotion practices among Maltese GPs. Apart from the fact that PA promotion in general practice could have a significant public health impact, this is particularly important since physical inactivity and obesity levels are very high in Malta and "stimulating a physically active lifestyle is public health's best buy" (van Mechelen, 1997, p. 264).

4.6. Future action

It is intended to publish the results of this dissertation.

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Appendices

Appendix 1: Ethical approval from the University of Chester

University of Chester

Faculty of Applied Sciences
Research Ethics Committee

Tel 01244 511740
Fax 01244 511302
frec@chester.ac.uk

6th May 2011

Dear Johanna,

Study title: **Promoting physical activity in general practice: Maltese GPs' beliefs, attitudes and practices.**
FREC reference: **522/11/JC/CS**
Version number: **1**

Thank you for sending your application to the Faculty of Applied Sciences Research Ethics Committee for review and for attending the meeting to clarify the points raised by the Committee.

I am pleased to confirm ethical approval for the above research, provided that you comply with the conditions set out in the attached document, and adhere to the processes described in your application form and supporting documentation. However, the Committee would like to make the following recommendations:-

- On the Participant Information Sheet, add UK to the end of the University of Chester address.
- Recommendation on Questionnaire, Q.1 Encourage more activity - you might want to look at widening the frequency gaps.

The final list of documents reviewed and approved by the Committee is as follows:

Document	Version	Date
Application Form	1	March 2011
Appendix 1 – List of References	1	March 2011
Appendix 2 – C.V. for Lead Researcher	1	March 2011
Appendix 3 – Letter of Invitation to Participants	1	March 2011
Appendix 4 – Participant Information Sheet	1	March 2011
Appendix 5 – Questionnaire	1	March 2011

FREC B
Approval letter – 2010/11

With the Committee's best wishes for the success of this project.

Yours sincerely,

Simon Alford
Chair, Faculty Research Ethics Committee

Enclosures *Standard conditions of approval.*

c.c. Supervisor
FREC Representative

FREC B
Approval letter – 2010/11

Appendix 2: Ethical approval from the University of Malta

To be completed by Faculty Research Ethics Committee

We have examined the above proposal and advise

Acceptance **Refusal** **Conditional acceptance**

For the following reason/s:

Signature Date

To be completed by University Research Ethics Committee

We have examined the above proposal and grant

Acceptance **Refusal** **Conditional acceptance**

For the following reason/s:

Signature Paul Mayo Date 6/5/2014

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Appendix 3: Questionnaire

Physical Activity Promotion in General Practice

Physical activity includes any activity from a low intensity level, such as walking, to a high intensity level, such as playing a competitive sport.

1. How often did you encourage your patients to have a more physically active lifestyle in the **last month**? *(please tick one)*

☐ Never
☐ Rarely, only 1-9 patients
☐ Sometimes, perhaps 10-19 patients
☐ Often, perhaps 20-29 patients
☐ More often, 30 or more patients

2. To what extent do you agree or disagree with the following statements: *(circle only one for each statement)*

	Strongly Agree	**Agree**	**Not Sure**	**Disagree**	**Strongly Disagree**
a. Taking the stairs at work and generally being more active each day is enough physical activity to improve health.	1	2	3	4	5
b. Half an hour of walking on most days is all the exercise that is needed for good health.	1	2	3	4	5
c. Exercise that is good for health must make you puff and pant.	1	2	3	4	5
d. Several short walks of 10 minutes each on most days is better than one round of golf per week for good health.	1	2	3	4	5
e. Discussing the benefits of a physically active lifestyle with patients is part of the GP's role.	1	2	3	4	5
f. Suggesting to patients ways to increase daily physical activity is part of the GP's role.	1	2	3	4	5
g. I feel confident in giving general advice to patients on a physically active lifestyle.	1	2	3	4	5
h. I feel confident in suggesting specific physical activity programs for my patients.	1	2	3	4	5
i. GPs should be physically active to act as a role model for their patients.	1	2	3	4	5

3. How often do you provide physical activity advice to patients who present with the following conditions? *(circle only one for each condition)*

		Never	Rarely	Sometimes	Often	Very Often
a.	Overweight	1	2	3	4	5
b.	Hypertension	1	2	3	4	5
c.	Known ischaemic heart disease	1	2	3	4	5
d.	Diabetes	1	2	3	4	5
e.	Hypercholesterolemia	1	2	3	4	5
f.	Depression	1	2	3	4	5
g.	Sedentary but otherwise healthy	1	2	3	4	5

4. How often does the following prevent you from promoting a physically active lifestyle in your patients? *(circle only one for each statement)*

		Never	Rarely	Sometimes	Often	Very Often
a.	Lack of time	1	2	3	4	5
b.	Lack of counselling skills	1	2	3	4	5
c.	Lack of remuneration for promoting physical activity	1	2	3	4	5
d.	Lack of interest in promoting physical activity	1	2	3	4	5
e.	Feeling it would not change the patient's behaviour	1	2	3	4	5
f.	Feeling it would not be beneficial for the patient	1	2	3	4	5
g.	Lack of suitably qualified exercise professionals to refer patients to	1	2	3	4	5
h.	Other *(Please specify):* _____ _____	1	2	3	4	5

5. What kinds of physical activity promotion would be feasible for you to deliver to your patients? *(circle only one for each statement)*

	Highly Feasible	Somewhat Feasible	Not Sure	Not Really Feasible	Totally Unfeasible
a. Brief counselling integrated into your regular consultations	1	2	3	4	5
b. Separate one-on-one consultations	1	2	3	4	5
c. Group sessions	1	2	3	4	5
d. Distribution of resources (e.g. brochures)	1	2	3	4	5
e. Referral to a suitably qualified exercise professional *(assuming availability of such professionals)*	1	2	3	4	5

6. Some general questions about your practice:

a. Average number of patients you see each week: _____

b. Your number of years in practice _____

c. Your sex ☐ Female ☐ Male

d. Your age in years ☐ <35 ☐ 35-44 ☐ 45-54 ☐ >54

e. Usual number of hours worked each week _____

f. The town/village(s) where you work: _____

g. In what kind of practice do you work?

☐ Private practice
☐ Private group practice
☐ Private hospital
☐ Public hospital
☐ Public health-centre

h. Have you ever completed a course or special training related to exercise science or exercise counselling? ☐ Yes ☐ No

7. a. Are you aware of the national physical activity recommendation for Maltese adults? ☐ Yes ☐ No

b. If yes, please describe the national physical activity recommendation for Maltese adults here.

_____

_____

_____

8. Finally, about your own physical activity:

a. How physically active do you think you are currently compared with other Maltese people of your sex and age? *(please tick one)*

☐ Much more active

☐ Slightly more active

☐ About the same

☐ Slightly less active

☐ Much less active

b. On average, for approximately how long are you physically active each week?

____hours ____mins

(Physical activity includes any activity from a low intensity level, such as walking, to a high intensity level, such as playing a competitive sport.)

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* Questionnaire adapted from:
Shirley, D., van der Ploeg, H. P., & Bauman, A. E. (2010). Physical activity promotion in the physical therapy setting: perspectives from practitioners and students. *Physical Therapy, 90*(9), 1311-1322.

THANK YOU

for participating in this research.

Kindly return your completed questionnaire to the researcher in the prepaid return envelope provided.

Appendix 4: Recruitment letter

16th May, 2011

_____

_____

_____

Dear Dr _____,

You are being invited to participate in a research study entitled *Promoting physical activity in general practice: Maltese GPs' beliefs, attitudes and practices*. This research is being conducted as part of an MSc in Exercise & Nutrition Science at the University of Chester.

Enclosed kindly find a *Participant Information Sheet* with further information about the study, the questionnaire (which takes approximately five minutes to complete) and a prepaid return envelope.

Thank you for your interest in this research and please do not hesitate to contact me if you would like further information.

Yours sincerely,

Johanna Calleja

Appendix 5: Participant information sheet

Participant information sheet

Promoting physical activity in general practice:
Maltese GPs' beliefs, attitudes and practices

You are being invited to take part in a research study. Before you decide whether to take part or not, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Please contact me if there is anything that is not clear or if you would like more information.

Thank you for reading this.

What is the purpose of the study?
This research is being undertaken on Maltese GPs. The project is to assess Maltese GPs' knowledge, confidence, role perception, and perceived barriers and feasibility with regard to promoting a physically active lifestyle with their patients. Their self-reported practice of promoting physical activity will also be assessed.

Why have I been chosen?
You have been chosen because you are a GP who practises in Malta.

Do I have to take part?
It is up to you to decide whether or not to take part and you are still free to withdraw at any time and without giving a reason. A decision to withdraw at any time, or a decision not to take part, will not affect you in any way.

What happens if I take part?
You fill out the enclosed questionnaire, which takes approximately 5 minutes to complete, and return it to the researcher in the prepaid return envelope. No one will be identifiable from the questionnaires and in the final report.

What are the possible disadvantages and risks of taking part?
There are no disadvantages or risks foreseen in taking part in the study.

What are the possible benefits of taking part?
By taking part, you will be contributing to an understanding of Maltese GPs' beliefs, attitudes and practices of physical activity promotion. In light of the high rates of physical inactivity and obesity in Malta, this could have important public health implications.

What if something goes wrong?
If you wish to complain or have any concerns about any aspect of the way you have been approached or treated during the course of this study, please contact Professor Sarah Andrew, Dean of the Faculty of Applied Sciences, University of Chester, Parkgate Road, Chester, CH1 4BJ, UK, (+44) 1244 513055.

Will my taking part in the study be kept confidential?
All information which is collected during the course of the research will be kept strictly confidential so that only the researcher carrying out the research will have access to such information.

What will happen to the results of the research study?
The results will be written up into a dissertation for the final project of my MSc. Individuals who participate will not be identified in any subsequent report or publication.

Who is organising the research?
The research is conducted as part of an MSc in Exercise & Nutrition Science within the Department of Clinical Sciences at the University of Chester, UK. The study is organised with supervision from the department by Johanna Calleja, an MSc student.

Who may I contact for further information?
If you would like more information about the research before you decide whether or not you would be willing to take part, please contact:

Johanna Calleja
Email:
Tel:

Thank you for your interest in this research.

Appendix 6: Statistical analysis

Table A1: *Crosstabulation to compare gender ratio of responders and non-responders*

			Sex		
			Female	Male	Total
Nonresponders	Responder	Count	37	119	156
		Expected Count	41.1	114.9	156.0
		% within Nonresponders	23.7%	76.3%	100.0%
	Non-responder	Count	41	99	140
		Expected Count	36.9	103.1	140.0
		% within Nonresponders	29.3%	70.7%	100.0%
Total		Count	78	218	296
		Expected Count	78.0	218.0	296.0
		% within Nonresponders	26.4%	73.6%	100.0%

Table A2: *Chi-Squared Test of association to compare gender ratio of responders and non-responders*

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.179[a]	1	.278		
Continuity Correction[b]	.909	1	.340		
Likelihood Ratio	1.177	1	.278		
Fisher's Exact Test				.293	.170
Linear-by-Linear Association	1.175	1	.278		
N of Valid Cases	296				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 36.89.

b. Computed only for a 2x2 table

Table A3: *Spearman's Rank Correlation Coefficient to test for a correlation between GPs' overall knowledge score and frequency of promoting PA*

			Frequency of promoting PA	Overall Knowledge Score
Spearman's rho	Frequency of promoting PA	Correlation Coefficient	1.000	.001
		Sig. (2-tailed)	.	.993
		N	155	155
	Overall Knowledge Score	Correlation Coefficient	.001	1.000
		Sig. (2-tailed)	.993	.
		N	155	156

Table A4: *Spearman's Rank Correlation Coefficient to test for a correlation between GPs' responses to the statement "Taking the stairs at work and generally being more active each day is enough physical activity to improve health" and frequency of promoting PA*

			Frequency of promoting PA	Taking stairs and generally being more active improves health
Spearman's rho	Frequency of promoting PA	Correlation Coefficient	1.000	.026
		Sig. (2-tailed)	.	.745
		N	155	155
	Taking stairs and generally being more active improves health	Correlation Coefficient	.026	1.000
		Sig. (2-tailed)	.745	.
		N	155	156

Table A5: *Spearman's Rank Correlation Coefficient to test for a correlation between GPs' responses to the statement "Half an hour of walking on most days is all the exercise that is needed for good health" and frequency of promoting PA*

			Frequency of promoting PA	Half an hour walking most days is all the exercise needed for good health
Spearman's rho	Frequency of promoting PA	Correlation Coefficient	1.000	-.060
		Sig. (2-tailed)	.	.455
		N	155	155
	Half an hour walking most days is all the exercise needed for good health	Correlation Coefficient	-.060	1.000
		Sig. (2-tailed)	.455	.
		N	155	156

Table A6: *Spearman's Rank Correlation Coefficient to test for a correlation between GPs' responses to the statement "Exercise that is good for health must make you puff and pant" and frequency of promoting PA*

			Frequency of promoting PA	Exercise must make you puff and pant
Spearman's rho	Frequency of promoting PA	Correlation Coefficient	1.000	.010
		Sig. (2-tailed)	.	.901
		N	155	154
	Exercise must make you puff and pant	Correlation Coefficient	.010	1.000
		Sig. (2-tailed)	.901	.
		N	154	155

Table A7: *Spearman's Rank Correlation Coefficient to test for a correlation between GPs' responses to the statement "Several short walks of 10 minutes each on most days is better than one round of golf per week for good health" and frequency of promoting PA*

			Frequency of promoting PA	Several short 10min walks most days better than one round of golf per week for good health
Spearman's rho	Frequency of promoting PA	Correlation Coefficient	1.000	.123
		Sig. (2-tailed)	.	.128
		N	155	155
	Several short 10min walks most days better than one round of golf per week for good health	Correlation Coefficient	.123	1.000
		Sig. (2-tailed)	.128	.
		N	155	156

Table A8: *Chi-Squared Test of association to test for a correlation between having completed a course/special training related to exercise science or exercise counselling and frequency of promoting PA*

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.004[a]	1	.045		
Continuity Correction[b]	2.842	1	.092		
Likelihood Ratio	4.042	1	.044		
Fisher's Exact Test				.060	.046
Linear-by-Linear Association	3.978	1	.046		
N of Valid Cases	155				

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 4.83.

b. Computed only for a 2x2 table

Table A9: *Measures of effect size of correlation between having completed a course/special training related to exercise science or exercise counselling and frequency of promoting PA*

		Value	Approx. Sig.
Nominal by Nominal	Phi	-.161	.045
	Cramer's V	.161	.045
	Contingency Coefficient	.159	.045
N of Valid Cases		155	

Table A10: *Spearman's Rank Correlation Coefficient to test for a correlation between GPs' overall confidence score and frequency of promoting PA*

			Frequency of promoting PA	Overall Confidence Score
Spearman's rho	Frequency of promoting PA	Correlation Coefficient	1.000	.226**
		Sig. (2-tailed)	.	.005
		N	155	155
	Overall Confidence Score	Correlation Coefficient	.226**	1.000
		Sig. (2-tailed)	.005	.
		N	155	156

**. Correlation is significant at the 0.01 level (2-tailed).

Table A11: *Spearman's Rank Correlation Coefficient to test for a correlation between GPs' confidence in giving general advice about PA and frequency of promoting PA*

			Frequency of promoting PA	Confident in giving general advice
Spearman's rho	Frequency of promoting PA	Correlation Coefficient	1.000	.298**
		Sig. (2-tailed)	.	.000
		N	155	155
	Confident in giving general advice	Correlation Coefficient	.298**	1.000
		Sig. (2-tailed)	.000	.
		N	155	156

**. Correlation is significant at the 0.01 level (2-tailed).

Table A12: *Spearman's Rank Correlation Coefficient to test for a correlation between GPs' confidence in suggesting specific PA programmes and frequency of promoting PA*

			Frequency of promoting PA	Confident in suggesting specific PA programmes
Spearman's rho	Frequency of promoting PA	Correlation Coefficient	1.000	.287**
		Sig. (2-tailed)	.	.000
		N	155	155
	Confident in suggesting specific PA programmes	Correlation Coefficient	.287**	1.000
		Sig. (2-tailed)	.000	.
		N	155	156

**. Correlation is significant at the 0.01 level (2-tailed).

Table A13: *Spearman's Rank Correlation Coefficient to test for a correlation between GPs' ratings of their PA levels compared to other Maltese people of the same sex and age and frequency of promoting PA*

			Own PA compared with other Maltese people - Reverse	Frequency of promoting PA
Spearman's rho	Own PA compared with other Maltese people - Reverse	Correlation Coefficient	1.000	.168*
		Sig. (2-tailed)	.	.038
		N	154	153
	Frequency of promoting PA	Correlation Coefficient	.168*	1.000
		Sig. (2-tailed)	.038	.
		N	153	155

*. Correlation is significant at the 0.05 level (2-tailed).